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Addressing Public Perceptions About Cell-Based Meat and Cellular Agriculture Through Metaphors

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ADDRESSING PUBLIC PERCEPTIONS ABOUT CELL-BASED MEAT AND CELLULAR
AGRICULTURE THROUGH METAPHORS

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ABSTRACT

ADDRESSING PUBLIC PERCEPTIONS ABOUT CELL-BASED MEAT AND CELLULAR AGRICULTURE THROUGH METAPHORS

Yvette Emma Hubbard
Old Dominion University, 2022
Director: Dr. Drew Lopenzina

Today's food movement places organic, holistic, and natural foods as priority. The idea aims for better human health, a farm-to-table community, and environmental sustainability. Soon a new meat alternative will become part of the ongoing food movement. What is it? Cell-based protein. It is a protein alternative to livestock protein. It is real protein from a real breathing animal. Cell-based beef for example is grown in a lab with cells from a living cow that does not have to die or be slaughtered. It is destined to become the new protein architecture on the horizon. Parts of this paper are science heavy. Therefore, I chose to use metaphors as a platform to negotiate the science discourse for laypeople who are unfamiliar with the science discipline. My research is based around R&D methods which leave livestock animals unharmed. With cell-based protein there is no need to kill and butcher them. In an effort to create dialogue around cell-based foods, scientists and marketing executives are using metaphors to facilitate and move the discussion of cell-based foods into mainstream media. An examination of rhetorical and metaphorical marketing strategies will aid in illustrating future advertising campaigns for cell-based foods. To aid my research I deployed a survey to gauge if consumer acceptance and public perception is skewed by what they are conditioned to think of as 'real' protein. Ultimately the research seeks a common ground using metaphors and rhetoric to thread communication gaps between scientists and the public.

Keywords: Cell-based protein, cellular agriculture, cultured meat, protein, metaphor

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CHAPTER I

INTRODUCTION

Food has always been a source of identity for people. I as a late Generation-X (Gen X) kid, I remember most of my childhood restaurant meals consisted of fast-food places like McDonald's chicken nuggets with a strawberry shake, In-and-Out burgers (animal style) and fries, and Wendy's double bacon cheeseburgers. But in 1984, still in my adolescent years, I would learn the dangers of how identifying with food could lead to an unfavorable outcome. That same year I began gymnastics. The Olympics were held in Los Angeles where we lived, and I was glued to the television and everything Mary Lou Retton. That same year a movie came out called Nadia. Nadia Comaneci was a Romanian gymnast. She was the first gymnast in history to get a perfect 10 and became an Olympic champion and world record holder. Nadia was exposed to a horrible eating blueprint that nearly caused her to die. I kept my thoughts to myself about Nadia. From that point forward I thought about everything I ate. Not if it was bad or good because at that age, I was not rationalizing food like that. My thoughts were about if it would make me fat or skinny. The second time this identity with food resurfaced was years later in high school. In health class the teacher shared how we can have better eating habits with the four-food groups. I remember he shared with us the types of good foods we can bring to lunch, and he spoke about the bad results of fast foods. In the 80s the fast-food industry seemed to be the catalyst for obesity. He said the fast-food industry did not fit into the mold of the food groups. Through nutritional classes in the military, I learned eating healthy foods coupled with training aided to shift my negative associations with food. Today people identify as meat eaters, vegetarians, vegans etc. I am a self-taught plant-based eater. I bought a book about plant-based eating years ago (before all the options were on the market today) and built on the things I

learned. What and where we eat says something about us, how we live, our food practices, how we maintain ourselves, and our socio-economic status (Almerico, 2014). However, how our body figures look causes society to judge our eating habits and assume our lifestyles. Through technology and information, we are better informed about genetics and how it literally shapes our body types. Socially there is greater understanding that a metaphorically ‘fat’ looking person does not equate to a lazy or unhealthy person. People are beginning to recognize that body images are often directly related to genetics and biology that are beyond our control. There are populations who look out of shape but are healthy. Conversely some people who are narrow and thin can be unhealthy. Just something to keep in mind when we look at each other.

SOCIAL MEDIA TRENDS

In the current food movement, I do not think as many people subscribe to the food group mentality nearly as much as they did in the 80s and 90s. In the last ten years alone the growth of technology and information sharing has pushed healthy, trendy, and popular food movements and environmental concerns to the forefront. Whereby Americans have drastically changed how they eat and live. People are more informed about multiple food combinations and recipes, such as ‘chocolate’ avocado pudding. Social media posts shared by chefs, food journalists and influencers have shaped the kinds of food people eat. Moreover, not just the foods they eat but where and how the foods are sourced. Fair trade, ethically and sustainably sourced foods are taking a progressive front seat due to environmental impacts of the food industry. It is not only with food but with everyday personal and home products. Today consumers are going to the grocery store carrying their own reusable bags and carrying their own reusable straws into restaurants. Travelers and professionals are caring their own reusable eating utensils. Companies

like Grove and EC30 are taking colossal measures to drastically aid in reducing the carbon footprint. Cosmetics and hair products are going vegan and even toothbrushes are being made with sustainable materials like bamboo. People are buying more locally sourced produce at farmers markets and choosing organic over non-organic. All those trends demonstrate how social media is a contributing factor to the growing food movement.

FARM-TO-TABLE

A generous part of society recognizes the agricultural farming practices of local farmers. Local small farms do not use mass production practices. The benefits of farmers markets are they offer the age-old practice of farm-to-table. Farm-to-table means consumers like you and I, and (usually local) restaurants are free to partner with a local farmer. That farm is where food sources like fruits, vegetables and roots are grown, as well as some livestock. There is no middleman, no logistics or supply chain. The food literally goes from that farm to the table. In the interest of less waste farmers markets also offer the misfits or oddly shaped fruits, vegetables, and roots and their consumers are open to buying it all. By virtue of their practices farmers markets and farm-to-table is cost effective and has a much smaller carbon footprint. Moreover, it builds community, friendships and partnerships through shared goals and common interests for healthy eating, a better environment and sustainability.

THE FUTURE OF PROTEIN

In the movement for good health and environmental sustainability, the meat industry is shifting as well. Cell-based meats are referred to as cultured, cellular, lab-grown, cultivated, in-vitro or clean meat. "I get it," you might be thinking, "what the heck is this kind of meat and is it safe?". To help put things in perspective, I was introduced to cell-based meat by my husband in 2017. He asked, "if you could eat meat without an animal having to die, would you eat it?". I

said, “yes, but how?”. Then he suggested that I look up Memphis Meats (now called Upside Foods). This paper will go into more details about cell-based meat, but for now, think of cell-based meat as real meat without having to kill and slaughter any livestock animals. The word livestock refers to all farm-raised, farm-housed, or farmed animals. Complications and challenges associated with food, specifically meat is highly controversial. A point of contention with conventional meat farming lies with environmentalists, scientists, the medical and health community, and animal advocates. To avoid any confusion, rather than using the word meat which leaves things open to interpretation. I will use the word protein to reference all protein products (beef, wagyu, bison, chicken, pork, turkey, duck, lamb etc.). Unless I specify one kind of protein, or I am sourcing (citing) I will maintain the use of the word protein. At the base of the controversy is the unethical way in which animals are raised and live. These sentient beings deserve a humane and ethical way of life. Moreover, the use of resources to support protein farming infrastructures across the country is staggering and stresses on the environment are irresponsible. The way livestock are raised and the methods for processing protein takes an alarming and dangerous toll on human health.

Due to the scientific nature of this paper, I thought it best to use three approaches to address the issues. First, I considered the great and ancient discourse of rhetoric. Advances in technology and platforms like Zoom, Twitter, Instagram and TikTok have caused a global evolution in the pace of society, how people communicate and the momentum with which movements take place. In my research I wanted to take advantage of the interconnections through technology. Therefore, I created an anonymous and voluntary online survey, which I share in Appendix A, and will talk more in depth later. Up front I wanted to observe figures of speech, specifically metaphors. I felt the survey coupled with the use of metaphors would cast a

broader net to assist with audience comprehension in the discourse of science. Scientists, researchers, scholars and industry professionals of cell-based proteins and cellular agriculture are the subject matter experts. Established in their profession, I will share and impart credible information from them regarding the beef, chicken and pork industry and environmental issues which affect humans, animals, and the ecosystem. Likewise, metaphors serve to connect consumers with science research terminology that would otherwise create a disconnect with scientific linguistics. The purpose of this paper is to address public perception of cell-based proteins and cellular agriculture.

HISTORY OF CELL-PROTEINS

Historical, scientific documents suggest the study of cultured protein dates as far back to the early 1900s. In 1912 Alex Carrel was the earliest scientist to successfully maintain a living muscle in a petri dish (Sharma Shruti, Sukhcharanjit Thind, and Singh Kaur. 2015). The late Willem Frederick van Eelen was also an early developer of cell-based protein. His motivation spurred from experiences in World War II as a prisoner of war. Van Eelen shares a barbaric moment. “If one of the stray dogs was stupid enough to go over the wire, the prisoners would jump on it, tear it apart and eat it raw. If you looked at my stomach then, you saw my spine. I was already dead” (Bartholet, 2011, p. 66). In the 1950s his pursuit of human health and ending superfluous animal suffering would ripple into the 1990s. It was then he filed many patents that would become the impetus of the first cell-based burger many years later (“Godfather of Cultured Meat” Willem Van Eelen Passes Away at 91 2015).

Other experiments resumed in 1998 when Morris Benjaminson made cultured fish from fish muscle; research demonstrated that goldfish muscle grew in a petri-dish an average of 14% (Pincock 2007). The following year the National Aeronautics and Space Administration

continued where Benjaminson left off, their goal was to provide astronauts with protein that was not freeze-dried (Pincock, 20007). Four years later in 2003, two Australian men grew and cultivated live muscle tissue from a frog. The muscle was cooked and served in the appropriately named, Disembodied Cuisine; the frog remained unharmed (Driessen et al. 2013). Historical cultured protein studies assist today's researchers, beckoning scientists to divert the traditional protein industry made of livestock and slaughterhouses to yield sustainable solutions. Though science has come a long way in the last decade. Cell-based protein and cellular agriculture continues to be in the R&D stages. In 2013, researcher, Mark Post debuted the first, cultured protein burger (Dance, 2017). Other accomplishments in the field include, the world's first cell-based beef meatball grown and introduced by Upside Foods in 2016, and cell-based chicken and duck in 2017 (About Us 2022).

If the protein industry and cultured protein companies partner up the results could be profitable for the companies and significantly contribute to the U.S. economy. Beyond Meat® and other food alternatives are currently in the R&D stages as well. The founder of New Harvest, Jason Matheny is a researcher and promoter of cellular agriculture (Table 1). Cellular agriculture can aid science and food ventures. For the food industry it means animal by-products such as milk, eggs and cheese can be produced from cells (Figure 1) (Wolfson 2005), which will be discussed further on in the paper.

Table 1. Nomenclature

Science/Market Terms	Aliases	Definitions
Cultured meat	Cell-based meat, In-vitro meat, Lab grown meat, Clean meat, Meat alternative/s	Muscle cells which are painlessly harvested from a living cow. Scientists then feed and nurture the cells so they multiply to create muscle tissue, which is the main component of the meat we eat. It is biologically exactly the same as the meat tissue that comes from a cow. (<i>Cultured Beef Process</i> 2015)
Plant-based foods, Plant-based meat, Meat alternatives, Meatless proteins	Plant-based chicken, beef, pork, sausage, fish, tenders, and filets	Plants-based equates to vegetables, lentils and roots of all sorts. Usually held together with tofu, wheat germ, plant-based flours, vegetable broth and other plant-based ingredients.
Certified Humane® Clean meat	100% Organic beef, Grass fed grass finish, Natural, Farm-to-Table	Beef from cows which are free and pasture raised for the length of their entire lives. They eat by nature's way. The beef is processed with grass. This is called, grass fed, grass finish. No grains, growth hormones or antibiotics whatsoever.
Cellular agriculture		Cells which are grown and cultivated in a bioreactor to produce other products such as: protein, cheese, milk, eggs, leather, fur, wood etc. (<i>What is Cellular Agriculture?</i> 2021)
Acellular agriculture		Casein, gelatin, vanillin, Omega-3 and ovalbumin (<i>What is Cellular Agriculture?</i> 2021)

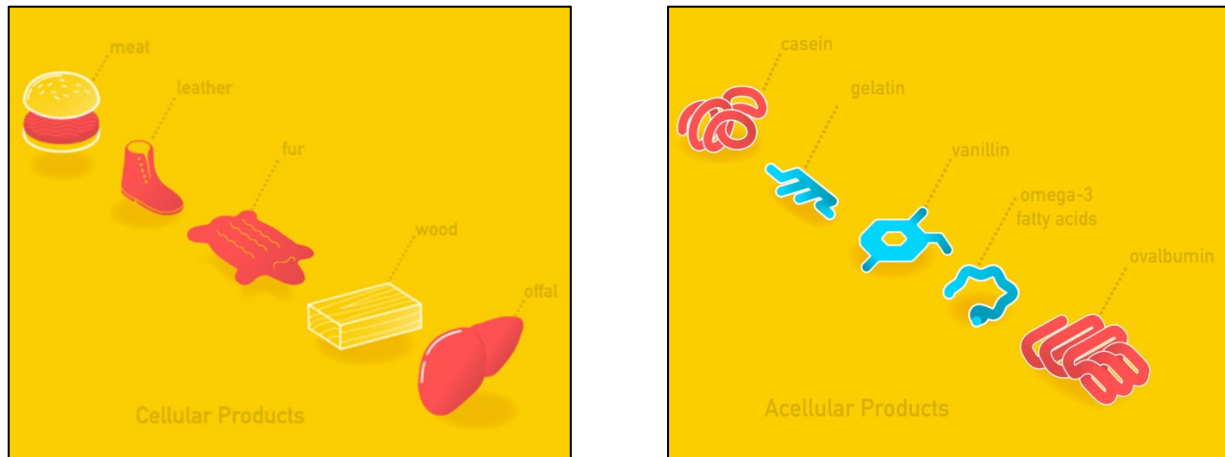


Figure 1. Cellular Agriculture

Note. “Agricultural products can be classified as acellular (without cells) or cellular (containing cells).” [Illustration](#) by [Nick Counter](#) for [New Harvest](#) // [CC BY-NC-SA 4.0](#)

CHAPTER II

LITERATURE

From this point forward when referring to cell-based protein and cellular agriculture together I will refer to them as cell-protein and ag. A common theme among the literature is how protein alternatives like plant-based proteins, and cell-protein and ag are making benevolent moves, not to be persuasive, rather to share their humane and ethical methods in what will be the first, modern cell-based protein architecture. Protein alternative industries are, rhetorically speaking, using strategic metaphors to “shift both the meaning of protein and what it means to choose between” traditional livestock protein and protein alternatives, together they also emphasize humane efforts and information sharing (Muhlhauser, Drews & Reitz, 2021, p. 1). Metaphors aid in bridging the communication gap of the overarching objective behind alternative proteins and eases sharing science, research, engineering, and industry lingo. People unfamiliar with the science discipline may find it challenging to understand and follow. Due to those challenges, I share the same perspective as Broad (2020) and Burgers (2016); they argue for a different approach in communication, and challenge scholars to investigate how people communicate using metaphors, especially in the context of cell-based foods. Figures of speech make science terms digestible, painting a mental picture of not only how cell-based proteins are grown but demonstrates how protein alternatives will help promote better health for humans, increase environmental sustainability, improve animal welfare, and decrease livestock protein production (Tuomisto & Mattos, 2011).

Media serves to push conversations along; it has bridged the gaps between consumers and plant-based food. More and more, cell-based protein developments are creating headlines and presents opportunities to open the dialogue about lab grown proteins. Moreover, discursive

methods for plant-based and cell-based protein have adopted metaphorical jargon as a means to make them relatable and socially acceptable. Especially to questionable consumers, who may otherwise have suspicions about the legitimacy of both. As the cell-based industry continues wrestling with discursive approaches, it becomes necessary to deviate from the science discourse to make conversations around plant and lab foods more engaging. In one study, Bryant and Dillard (2019) explore the vocabulary people use when communicating about and describing cell-based protein, not only in their study, but in media. They provided their participants a one paragraph description of what cultured meat is. After the read they asked participants to give one word of what they thought about cultured meat (p. 3). They explored three different frames: “societal benefits,” “high tech,” and “same meat.” (p.1). Moreover, they examined how questions or statements are framed, either negatively or positively to garner favorable or adverse responses. Then compiled a table of word associations. Some of those same words I also found in the results of my survey which I will discuss later. Marketing professionals have done this for years with the aid of visual rhetoric. They put out words and images to intentionally stir thoughts and evoke conversations around the product. Visual rhetoric is multimodal. It allows people to compare semiotics and meaning, reinforcing how visuals “have an effect that words do not” (Dobrin & Morey, 2009, p. 25). Muhlhauser, Drews and Reitz (2021) share how metaphors and their modalities are the beginning of “comparative concepts” within the increasing and competitive food industry, specifically the beef industry (p. 3).

Livestock proteins are no longer the sole contender in the protein aisles. Today’s consumers will see signs in the protein and frozen sections of supermarkets which read: Meat alternatives, Plant-based Proteins, Plant-based and Plants. It will not be long before marketers and advertisers will have to find a discourse for cell-protein and ag. Metaphors within the

livestock, cell-protein and ag, and plant-based industries provide a connection of allegorical terms. The terms offer a real and logical way to think about the names and compare the positives and negatives between the three. Moreover, figure of speech propels rhetorical agendas and aids us in our dialogue so we can make comparisons between talking points (Davidson, 2011).

MEAT LOBBYISTS

Verbiage plays an informed role, where to be effective, must be executed to the level of the target audience. In the late 1950s propaganda to promote the four food groups was to “eat more,” but over the years the link between the consumption of animal meats and chronic diseases began to raise concerns with people in the health professions (Hannan & Nibert, 2020). The conversations about eating more began to shift as the Dietary Goals for the United States was introduced and the message was to decrease protein consumption and other foods that had a high fat content (Hannan & Nibert, 2020). Overall, the push for a healthier diet was better for consumers, and while some may disagree, vegetables are and have always been cheaper and more affordable than protein. Medical and health professionals began to ostracize the protein industry when researchers conferred and explained how minimizing (livestock) protein intake can reduce human health issues. Such health consequences include but are not limited to heart disease, high cholesterol, diabetes, and stroke. In the wake of improving better eating habits, the promotion of the four food groups was done away with, and the United States Department of Agriculture (USDA) food triangle was introduced. The food triangle included images and explanations that negatively impacted the protein industry. However, the protein industry pushed back, meat lobbyists were consistent in their efforts to change the vocabulary, and the visual rhetoric associated with the new food triangle, and the verbiage written in the guidelines to dismiss any suggestions of limiting meat.

The book *Meatsplaining*, Hannan and Nibert (2020) demonstrates the decades of debate about the rhetorical ideas in creating healthier dietary guidelines. *Meatsplaining* shares the types of vocabulary and verbiage used by meat lobbyists and the dietary guidelines advisory board (DGAC), in order to influence different eating habits among consumers who choose to eat proteins and those who do not. The meatsplaining offensive came about to keep the word ‘sustainability’ out of the DGAC’s 2015 report (Hannah & Nibert, 2020). It was a digressive tactic in discourse, and as a result, aided meat lobbyists in maintaining their monopoly over the protein industry. The rhetorical conflict between meat lobbyists and the DGAC is to highlight the most important thing the meat industry is afraid of losing: their profit. It asserts human health; animal welfare and environmental health are unimportant and therefore not on the agenda of meat lobbyists. Fast forward to today 2022, the movement for reduced meat intake is in full swing and those who are part of it are making it happen without DGAC or meat lobbyist’s permission. Once a movement begins, and it progresses, as it has over the last ten years, there is no stopping it. Today the movement for less meat and sustainably continues to ripple through every part of the food industry and milks are not off limits either. Meat lobbyists chose to ride the coattails of milk lobbyists as it relates to seed, nut and plant-based milks. Resistance to non-dairy milk parallels resistance to cell-meat and ag. Coconut milk the most famous of all milk, has one of the longest histories in the Hindu and Indian culture. Cows in India are esteemed and celebrated, not used for food or milk. Moreover, coconut milk has been used as a traditional part of cultural diets and spiritual practices for centuries. Therefore, contention over using the word milk for plant-based milk is gratuitous at best. The inclusion of plant-based foods and milk is quickly becoming the norm in conversations between family and friends. At restaurants tables menus offer plant-based protein alternatives, and more broadly in supermarkets. Just seven years

ago, the seemingly sole vegans and vegetarian option consumers could find was Amy's Kitchen products. Amy's is an organic and vegetarian based company that has been around since the late 80s. Any other plant-based options back then could only be found within affluent stores like Whole Foods, Fresh Market, Harris Teeter, and Trader Joe's. Today consumers can go into the most urban of supermarkets and find plant-based foods that have their own section and aisle. The dramatic and radical shift to promote health and sustainability is stronger now than it has ever been.

SCIENTISTS AND FARMERS TEAMING UP

In my studies I found, most people have not heard of or have knowledge of cell-based foods, and those who have, have skewed and preconceived ideas about what it is. I learned those ideas are based off what my sister shared as a mental visual of a science lab and a petri dish. While the science of cell-meat and ag is very interesting to the scientist and me, the public is not so impressed. Therefore, I wanted to explore what people think about alternative protein. What kind of vocabulary does the public use to associate with plant and cell-based protein? Do certain words make it more relatable or more distanced? Consumers, social media, journalists, and the science and research community use different diction and sometimes metaphors to discuss meat alternatives, to create understanding and acceptability. Metaphors provide similarities by constructing a "frame for the way people see the world" and apply reason, instead of grappling with ways to communicate about cell-based meat and ag and the lab-meat architecture (Broad, 2020, pg. 921)

One media study about cultured meat in the US and UK observed 12 media groups: six from the US and six from the UK, over a six-year period from 2013 to 2019 (Painter et. al., p. 2385). Media forums included some of the top names in journalism, The Boston Globe, Los

Angeles and New York Times, USA Today, Wall Street Journal and the Washington Post, and in the UK The Guardian, Independent, Mail, UK Financial Times and Telegraph. The researchers chose words or groups of words which included: meat, cultured, lab-grown and in vitro to see what results came up and if the articles were directly related to cultured meat conversations, or if the articles were about different subjects with related words. More importantly, the study was in progress when the first lab-grown burger was introduced mid 2013. They found, media and scholars frame environmental arguments to favor the cell meat industry. In doing so, explanations around studies suggested cell meat uses less greenhouse gas emissions, land and water, than conventional breeding, raising and slaughtering of cattle and other livestock (Painter et. al., 2020). Less discussed were issues related to cell-based meat including taste and texture, the higher return per cell than conventional farming, and future opportunities for farmers and scientist to share in the cell-based meat industry together (Painter et. al., 2020). Founder of Upside Foods Uma Valeti and Friedrich of Good Food Institute (GFI) address this issue and share their common goals to come together with farmers. The objective is not to disrupt or do away with the protein industry but rather to integrate cell-meat and ag, and plant-based proteins into the industry. Friedrich says, “we need their economy, global supply chain, marketing expertise and the massive consumer base” (Friedrich, 2019). The target audience is not limited to die-hard protein-eaters, but supporters and advocates who promote the progression of livestock welfare; not necessarily just vegans and vegetarians (Dance, 2017). Other cell-based companies include: New Harvest, they specializes in cellular agriculture, to grow eggs without chickens, and milk and cheese without cows. Finless Foods is growing cell-based fish, Geltor specializes in collagen and gelatin using “animal proteins and decades-old fermentation technology” (Dance, 2017), and Perfect Day and Clara Foods are using proteins and yeast to use in producing food

and beverage products (p. 706). Foods on the plant-based side include the launch of the Impossible™ Burger in 2016 (p. 705). Beyond Meat® added plant-based sausages to their line and Eat Just produces plant-based eggs from mung beans. Today companies offer a variety of meatless sausage patties, crumbled burger and sausage, chicken strips and meatballs, demonstrating the myriad of research, technology, engineering, and development currently in play. All which can be found in articles on their websites. Speaking of articles. Painter, Brennen and Kristiansen found in an analysis of media articles, 53% of people quoted in the articles were representatives of the industry or company and 26% were “academic and scientist without industry affiliation” (Painter et. al., p. 2388).

COVID-19 AND FARMING METHODS

Research continues to associate declining human health with traditional, livestock protein intake. A high-stakes demonstration of poor foreign farming methods hosted the beginning of the Coronavirus Disease 2019 (COVID-19) pandemic. Approximately six out of every ten known human (diseased) infections come from interactions with animals, while three out of every four emerging infections, according to the Centers for Disease Control (CDC) are predicted to be zoonotic in nature (Attwood & Hajat, 2020, p. 3116). It begs the question, how would alternative foods like cell-based meat and ag have made a difference during the COVID-19 pandemic. Would there have been less cases? As a result of COVID-19 U.S. sales of plant-based protein alternatives were up by almost 200 % in April 2020 compared to the same period in 2018 (Attwood & Hajat, 2020; Purdy, 2020). Further studies share the shift, specifically in first world countries, sales in organic products were up compared to pre-pandemic; “sales in the UK went up by more than 25 % in March and April 2020” (Attwood & Hajat, 2020, p. 3118). Moving forward it will be interesting to observe if people have or are more likely to transition to the

current plant-based alternatives permanently. In looking for healthier and safer alternatives, the risk of disease would be far less a factor in cultured and cellular foods. Perhaps the pandemic could be a catalyst to change the ideas people have about the protein industry, and used as a platform to educate the public about cell-based products. Based on similar opinions between scholars, there is an absolute correlation in negative health exposure between humans, animals, and the environment (Attwood & Hajat, 2020; World Health Organization, 2017). Researchers confer to explain how cell-based meat will minimize human health issues such as heart disease, high cholesterol, diabetes, and stroke to name a few. Scientists and technicians demonstrate how their advances will offer consumers a variety of cell-based, lab grown beef, poultry, pork, duck, fish, cheese, milk, and eggs alternatives, while capturing similar, if almost identical taste and texture without harming or slaughtering animals.

Soon, cell-meat and ag will relieve, and likely free many livestock animals, from a lifetime of cruel, unethical living conditions and abnormal diets. The atrocities and unsanitary conditions of the current farming architecture are gruesome. Many livestock are raised in concentrated animal feeding operation (CAFOs) cages. These sentients have little room to move, they cannot turn around, are never exposed to daylight, are overfed an unnatural diet with grains and fillers, injected with growth hormones and antibiotics, and exposed to pesticides. The lives of humans, animals, and the environment are in danger as a result of complications associated with CAFOs, thus causing greater health consequences (Post, 2012). Due to closed living spaces, CAFOs provide a perfect breeding ground for fecal contamination, diseases, and the spread of bacterial pathogens such as *Escherichia coli* (*E. coli*) and salmonella. Both of which have been known to cause several epidemics in the U.S. alone. Lastly, the composition of farmlands are a combination of nitrogen and phosphorus in animal manure. Both contribute to soil imbalance

affecting surface and groundwater, harming aquatic ecosystems and human health (Godfray et al., 2018; Ward et al., 2005). Other scholars like Broad (2020), Hannan and Nibert (2020), and Tuomisto (2011) agree the traditional farming architecture is riddled with climate and environmental degradation, deforestation, lack of animal welfare and human health related problems.

GENETICALLY MODIFIED ORGANISMS

Genetic modifications to cell-based meat bring concerns and raises a red flag for others. I would urge meat eaters to consider why this matters. The Monsanto era of genetically modified organisms (GMOs) within the seed industry have brought a negative stigma to scientific terms like genetically modified, thus causing waves of debate for decades. Monsanto, a businessman who acquired U.S and international seed companies, became the second largest seed company in the world giving him “control of approximately 90 percent of the world’s genetically engineered crops” (Kimbrell & Mendelson, 2005). In a 2005 report, soybean farmers could not find conventional soybean seeds and to date remains difficult. A 2015 USDA fact sheet reported how “over 70 percent of the soybeans grown in the U.S. are used for animal feed, with poultry being the number one livestock sector consuming soybeans, followed by hogs, dairy, beef and aquaculture” (USDA Coexistence Factsheets - Soybeans 2015). The contention lies in weed killer dicamba, used on corn and soy crops. Monsanto’s genetically modified seeds are resistant to the herbicide so much so that when dicamba is sprayed, crops will survive the spray and in fact can linger in the air causing human health problems.

To be clear. GMOs are not bad. Processed food is not bad. In fact, unless people are dedicated vegans who live off the grid, chances are they consume some sort of processed item. Think about it. When standing at the entrance of a supermarket, the produce section, the frozen

vegetables, nuts, and legume sections are the only parts of the store that is not processed, maybe some GMO, but not processed. Many people who are extremely knowledgeable about the body, mind, health, wellness and fitness dabble and eat processed foods. Isha Datar, Executive Director of New Harvest (2021) shares in her TED Talk how “we have been modifying microorganisms to make proteins for us for decades.”

In an effort to even the playing field for protein and human health, researchers at Upside Foods, Mosa Meats, New Harvest and many other companies are currently developing cell-meat and ag. The mention of ‘cell’ anything can be understandably off-putting to the public. Therefore, framing a conversation or statement around the topic of cellular foods is essential in delivering meaningful and useful information. With conversations come visuals, which are multi-modal whether text, images or colors. When people Google: cell-based meat, the text and images which come up create some sort of mental and visual influence be it, positive, negative or everything in between. Text is visual and plays an equally important role without an image, within an image, or placed besides, above or below the image. Over the last 15 years, the conversations around genetically modified foods have not been supported, due to the negative associations with Monsanto. Bryant and Dillard (2019) share how technology and food combined is the current and future path of food architecture. They also explain how there is little research done on the intentional use of various frames to introduce audiences to foods connected to technological innovation (p. 2). Parallels in the literature share how limiting science characterization of cultured meat can drive a broader approval for it. The study found: 64.6% were willing to try cultured meat, 18.4% were not willing to try cultured meat, whilst 16.9% were unsure. 49.1% of optimistic participants were willing to buy cultured meat regularly, while 24.5% were not willing to and 26.4% were undecided. Last, 48.5% were willing to eat

cultured meat as a replacement for conventional meat, while 26.6% were not willing to and 24.9% were undecided. (pp. 4)

Finally, Bryant and Dillard (2019) and Shaw and Iomaire (2019) created a categorical list of words people use when communicating about cultured meat in the study and in media. People born at the latter part of Gen X, along with millennials and Generation Z (Gen Zers) are the more health-conscious groups. Advances in technology have created a greater awareness of healthy ways of living, from training, getting enough sleep, eating healthy and eating clean. There is also the trendy side of food and health driven through television shows, social media and journalism. It creates a motivation and drive in the younger population of people for health and wellness. As a result, research found younger people were more open and accepting of cultured meat, but attitudes differed and were less accepting in older participants.

A 2017 study showed that one-third of US consumers would be willing to consume cultured meat on a regular basis (Loo et al., 2020; Wilks & Phillips, 2017). Perhaps COVID-19 beckoned the medical community, researchers, and scientists to drive the conversation for cell-based proteins. Especially since consumers were embracing environmental agendas in the wake of the 2020 elections. Though changing minds about cell-based proteins may rely on communication through social media, journalism, and information. It's only through communication, education and opinions about cell-based proteins and cellular products that will amass support ahead of the products coming to market. Only 9 to 19% of people who received information about the benefits of cultured meat shared that such meat would be accepted by consumers (Hocquette et al., 2015; Loo et al., 2020).

PROTEIN ALTERNATIVES

Scholars agree the COVID-19 pandemic was indicative of trends favoring plant-based meat alternatives due to health and environmental benefits to consumers (Beyond Meat, 2018; Impossible Food, 2018; Loo et al., 2020). The focus of lab-grown and the plant-based proteins are distinct, Upside Foods uses “essential nutrition, feeding cells exactly what they need to thrive” to grow cell-based meat, Beyond Meat® is plant-based using pea protein, and the Impossible™ Burger is plant-based using animal-like protein produced by yeast (Loo et al., 2020). More recently McDonald’s joined the plant-based movement. On January 20, 2022 they announced that they “co-developed with Beyond Meat®” a new type of plant-based patty made with “peas, rice and potatoes”, it rolled out February 14, 2022 (McDonald’s® Begins Small McPlant™ Operations Test at Eight U.S Restaurants 2022). Each of the four beef alternatives use significantly less water, land, energy, and greenhouse gas (GHG) emissions compared to conventional beef, therefore, proteins alternatives favor the current opinions scientist’s share about our environmental issues (p. 3). As a result, it is possible cell-based meat and ag products can garner support and be welcomed with open arms to contribute to the health of society, and further promote sustainability and smartly sourced ingredients (p. 3).

With so many avenues available to take on such a challenging topic as cell-based foods, figures of speech have the greatest benefit. Metaphors used in concert with visual rhetoric generate conversations in social media and journalism. Rhetoric stimulates knowledge and motivates debatable issues between generations and as a result can help close the gap. Some topics of debate include environmental, human health and animal welfare. Plant and cell-based companies highlight the positive environmental impacts they can have and how traditional meat cultures are damaging nature (Muhlhauser, Drews & Reitz, 2021). Rhetorical discourse advances

communication about the “killing of animals for food to the point where it could become less socially acceptable” (p. 5). Protein alternatives will never have a one hundred percent victory over livestock proteins. Though, the idea of metaphors and rhetoric used in advertising and communication of protein alternative, nudges the conversation away from a science discourse to simpler digestible terms. Approaching alternative protein advertisements and media with metaphors, aids in producing comparable and relatable ideas about how consumers think about and associate their health and eating choices with protein alternatives.

In Texas consumers and tourists will find signs around supermarkets which read, Flaming Bird, or drive past a restaurant called Freeb!rds. Are these words and slogans enticing, and does it make people want to run in to buy a bird? It is possible some words aim to be metaphorical, though I would argue advertisers and marketing entities aim to intentionally paint a vision in consumer’s minds of just an animal with no value, other than to be eaten. Essentially, the animal is a thing to be used in advertising for the benefits of the company’s economic agenda. Though more and more, companies are aiming for the health of their consumers. They are also focusing on the welfare and wellbeing of animals. For example, there is a television commercial that advertises Butcher Box. The name alone suggests a few different images. Before knowing anything about it. I imagined an array of animal parts like pig ears, beef lungs and cow bones. Exactly like animals dismembered and found in the dog treats aisle of a pet store. However, the commercial shares visuals of different cuts of beef, chicken, and pork with a twist. Unlike other traditional protein companies Butcher Box synchronizes with and does well to fall in line with their consumer’s philosophies and the current food movement.

The company neither operates or partners with conventional farmers, farmhouses or CAFO kept farming. Rather, they are Certified Humane®. Butcher Box only works with farms

where animals roam free in natural pastures all their lives (Our Sourcing 2022). Chickens are many sizes smaller than caged and are not fed soy. Cows get to be cows and roam free while grazing. There is no need to inject the animals with antibiotics, fillers, and growth hormones to minimize and combat illnesses and weight loss like those kept in CAFOs (Galusky 2014). Food fillers and injections of growth hormones and antibiotics end up ingested by humans via meat consumption. Post (2012) explains how human intestinal issues, health problems and several illnesses are related to the meat processing methods. Contextually, an animal that is pasture raised their entire lives and Certified Humane®, are not exposed to GMO feed, pesticides, antibiotics, food fillers or growth hormones, and unfortunately, the animals will succumb to their demise by slaughter. At the very least consumers who do prefer Certified Humane® proteins can take solace in knowing the animal lived a good, full, healthy life without suffering in the atrocious living conditions of conventional farming and CAFOs. Butcher Box delivers beef that is grass-fed and grass finished. Essentially it is the cleanest and most natural protein you can get on the market to date. Farm-to-table protein and agriculture follow some of the same principles. Other terms that follow these fundamental methods include: buy local, farmers markets, locally sourced etc. Many restaurants are moving from the conventional protein industry and distributors to farm-to-table livestock.

Within the fast-food industry, online food companies, supermarket foods or high-end and Michelin restaurants. The bar has been set. The negative impacts from Monsanto's monopoly of staple crops are no longer tolerated. Unfortunately, the ripple effects of that food disaster will linger for decades. Current food movements and trends are likely going to continue evolving with healthier intentions in mind. Especially since the 2020-2021 COVID-19 pandemic forced society to rethink not only their work habits but their eating habits. It also reinforced the

augmentation of other farm-to-table food delivery companies such as Freshly, Blue Apron and Hello Fresh. All vying for the top spots in ease, diversity, health, and nutrition.

METAPHORS IN MARKETING

Alternatively, marketing teams may aspire to make a play on words or use word association to provoke other mental images. Other advertisers choose to be transparent with a fun and playful approach potentially to attract the younger generation that is more food focused. Afterall, social media platforms such as TikTok and memes have provided entertaining platforms for advertisers to ride on. Supermarkets like Wegmans' chose to ride the wave with their own brand of plant-based foods. First, the wording on the sign in the refrigerated aisle reads Meatless Proteins. The word meatless is both literal and metaphorical. In the literal context, it is not meat nor traces of livestock meat mixed in it. From a metaphorical perspective, vegans, and vegetarian (and some meat) eaters know meatless equates to plant based. So why not just call it plant-based proteins? Meatless proteins deliver a metaphorical and indirect message from companies who share the same moral and ethical principles as their consumers. Together they share and hold positions which highlight and fight for: the humane treatment of animals (livestock), human health, environmental sustainability, ethically and sustainably sourced foods, and fair and free trade. Consumers who share in those concerns can support the companies and vice versa, together they advocate for each other. Plant-based companies seemingly take on the psychological and emotional responsibility to ensure the consumer has not participated in the role of killing an animal or harming the environment needlessly. In essence the idea behind metaphors is to exploit the literal meaning for a sustainable, resourceful marketing agenda (Camp, 2006). Behind the refrigerated glass doors is an amusement of visual rhetoric. Wegmans'

meatless beef line comes packaged in a white, plastic bag, labeled with capital, bold, red letters reading: “DON’T HAVE A COW.”

Below the words. Centered on the lower half of the bag is a picture of a burger, and to the right of the picture is a red prohibition sign with an elementary drawing of a black and white cow, with a black line drawn through it. The prohibition sign is indicative of the intentional distance between animal and food. It ties protein alternatives with an animal friendly approach, perhaps in an attempt for consumers to think about the animal itself. Images like the prohibition sign with the cow, may draw on the emotional impairment; humans have been conditioned to ignore or overlook the lives of livestock. Moreover, Wegmans did not stop with a beef line, their meatless chicken products follow the same visual rhetoric with yellow letter, reading, DON’T BE A CHICKEN and lastly in green letters, DON’T BE A PIGGY. While enjoyable and entertaining, the visual rhetoric shares an improved perspective for otherwise serious issues related to health, environment, and livestock welfare. In advertising, companies intentionally aim for engaging and compelling images to ensure the linguistic message is present (Barthes & Heath, 2009). Where more established and familiar companies like food and restaurant giant Marie Callender’s require less visual rhetoric. They partnered with Gardein™, a plant-based meat company, for their Meatless Be’f and Chick’n Pot Pie. Packaging is similar to the original pot pies, with acknowledgments of Marie Callender’s partnership with Gardein™ (Chick’N Pot Pie with Gardein™ Inside).

Furthermore, the packaging communicates reasoning with metaphorical verbosity. Even if figures of speech change over time, it does not have to be a showstopper. For example, Wegmans’ plant-based line used a metaphor familiar to gen-X and Gen-Z. In the 80s people used the expression, “Don’t have a cow.” It did not mean a human is having or giving birth to a cow,

rather it was a way to tell someone to calm down. Today, Wegmans' plant-based chicken Don't Have a Cow presents a new meaning entirely, though still relatable to both generations. The expression implies if you avoid eating a butchered cow, then you are not having a cow, or in literal terms, eating a cow. Likewise, it suggests the company's position in a direct message to consumers to abstain from purchasing protein produced from an animal. Metaphors aid marketing teams in maintaining transparency, this is how they hold their position to bolster the dilemma with farm raised food and environmental issues, for which plant-based foods originated. As Americans we have our own lingo and relatable figures of speech to make us "aware of the distinction between the two layers of meaning as well as the connection between them" when we read the packaging for Wegmans' plant-based foods (Camp, 2006, p. 289). Commonalities in speech benefit marketing strategists in experimenting with semantics for advertisers to benefit the economy.

Television commercial for Morning Star, a plant-based food company, created advertisements for a new protein alternative brand called, Incogmeato. A play on the word incognito, to share a fun description of how plants are incognito to look and taste like real protein. Just above the name Incogmeato is a logo evocative of an affluent cow adorned with a mustache, top hat and a monocle; suggesting Incogmeato is the elite of plant-based proteins. The commercial shares visual images of plant-based chik'n, beef and pork, all which look identical to their original protein partners, and an amusing slogan, Plants. A Whole Different Animal.

Unfortunately, the discourse for lab grown meat remains inconsistent depending on which person or company is being interviewed, or which website or journalism article one visits. The lab-grown protein is indicative of unconventional livestock methods. However, protein which is grown, is a word connected to the conventional meat industry. Animals are grown or

being raised for their meat, where in a lab, meat alone is grown and cultivated. Think of a flowerpot that can grow a healthy size tomato plant that will bear over a dozen tomatoes. Better yet, think of the ways in which microgreens are grown, no yard is required. I use Hamama, one of the most popular brands of microgreens on the market to date. One 12.5x6.5x2 tray of microgreens grows in 7-10 days and yields one week worth of greens for two people, depending on how much each person eats (Hamama, 2021). Microgreens are the smallest versions of full-grown plants of the same kind. For example, there are broccoli microgreens, spinach, wheatgrass, daikon radish, kale, the list goes on and on. Microgreens are highly packed with vitamins and nutrients, more than the full-grown plant. Anyone can grow them; microgreens do not require acres of land or hundreds of gallons of water to grow. The same idea applies to cell-based meat.

Rather than using livestock to grow meat for consumption, scientists are using labs to grow only the meat. Lab grown meat can be constructed to mimic livestock meats currently on the market. For example, the Impossible™ Burger is partially lab-grown, as a result of the heme used to create the ‘juiciness’ or ‘blood-like’ look of the burger. Heme is the catalyst for the human senses with meat products, it is found in animals and plants, but Impossible™ Food scientists found it in the soy leghemoglobin, which is produced in the roots of the plant (Heme + the science Behind Impossible™). In a push for sustainability scientist decided on a fermentation process for the heme, where they combine the deoxyribonucleic acid (DNA) from the root of the plants and mix it in with yeast to make the look, taste, and texture of the Impossible™ burger (Heme + the science Behind Impossible™). Advertising strategies promote the market, but people and conversations drive the market. When advertising strategies “evoke the ambitious, aspirational, and transformational nature of meat technologies”, then it is possible people can

juxtapose the ethical systems of cell-meat and ag with the unethical handling of animals that are inhumanely raised and slaughtered (Muhlhauser, Drews & Reitz, 2021, pg. 3). While the Impossible™ burger is genetically modified, advertisers promote the look, taste and texture of the product. With cell-based meat, taste and texture remain an obstacle.

Cell-based protein has merged into the threads of technology where the media characterizes cell-based protein the hero of longtime food and environmental issues, with no proof of promise. Truth is, that cell-based protein is still in the infancy stages of research and development (R&D) where mass production initiatives are concerned. Moreover, not one of the approximately 30 companies associated with the cultured meat and cellular industry, have conceded as to whether or not cultured meat will prove to be a climatically, sustainable alternative to conventional meat productions (Painter et. al., p. 2383). However, the cell-based protein industry has been more than transparent about mass productions obstacles and shortfalls, especially where regulatory the framework involves aspects of labeling and food safety, both domestically and across the pond (p. 2382).

MEAT AND GENDER

Media studies conducted by Painter, Brennen and Kristiansen (2020) discovered how people associate with the cell-based meat industry and how the public discusses it in the media. Between media and in academia, cell-based meat is shared as the “more humane or ethical way” to use livestock to produce meat, as it significantly reduces animal suffering, and does not disrupt the normal way of life of the sentients (Hopkins & Dacey 2008; Painter et. al., 2020; Schaefer & Savulescu 2014). Other themes associated with meat alternatives included environment, food security and human health (Painter et. al., 2020). Beyond the aforementioned, Singer (2016) shares an interesting connection between plant-based foods and livestock meats,

and gender. There is a masculine and feminine role which food plays within “the politics of nature and cultural identity” (Buerkle, 2009; Freeman, 2010, 2013, 2014; Hahn, 2010; Hahn & Bruner, 2012; Heinz & Lee, 1998; Rogers, 2008; Singer, 2016). Meat alternatives such as tofu and plant-based brands are associated with the feminine gender to associate with a desire to eat healthy. Though, the word healthy can be a point of contention because some people may correlate it only with (livestock) protein products. Where others identify themselves with the kind of food they eat or with what foods define health. For example, for some people healthy foods are purely plant based, peanuts, legumes, vegetables, roots, and fruits.

In her article about Meatless Mondays, Singer (2016) shares how some opinions of plant-based foods voids men of feeling full and lacking real protein. In a country where inclusiveness and equality are gaining momentum, and the gender divide seems to be fading, Meatless Monday campaign promoters could be grappling with the masculine mindset associated with meat. According to Singer (2016) the Meatless Mondays campaign is fundamentally to address health first, and other issues such as environment, livestock welfare and foodborne diseases, are treated as alternate talking points. For decades the push to reduce protein intake has been an uphill battle between the protein industry, medical field, scientists, health and nutrition professionals, and environmentalists. However, in the more recent movements for all things yoga, mindfulness, and humanism; environmental issues have taken center stage in the debate for reduced protein intake and more plant-based eating. I first heard of Meatless Mondays while watching Live with Kelly and Ryan. Ryan Seacrest often jokes on the show about how he is mostly vegan but enjoys all foods with friends on the weekends. Meatless Mondays provides a start in the week to reel in his vegan practices. Seacrest’s position is not a secret, he is open and transparent about being a foodie. On the other hand, his transparency also implies that he may be lacking, or desiring the

fulfillment traditional meat provides. Singer (2016) agrees meat is a masculine food which men will not concede to give up for tofu or plants. In an effort to argue against Singer's opinion, I noticed a distinctive divide between genders, and how advertisers and consumers perceive protein to be male dominated food.

From spring through summer people are guaranteed to smell a barbecue (BBQ) or participate in one as the grill master. For the population of females and feminist who argue, grills are for girls, they will have a long, almost defeating effort to find fun female BBQ aprons. Consumers can surf through the Amazon website where they will find a majority of BBQ aprons give priority to the man. Not only are the aprons male focused, but the messages printed on them are masculine driven. Not sure if the intention is to suppress women, feed the male ego, objectifying his man parts, or make women feel that men and their 'meat' masculinity are the epitome of what BBQs revolve around. Depending on the audience, the verbiage can be degrading to women with an absolute intent to be salacious. On Amazon consumer can find BBQ aprons reading: "Once you put my meat in your mouth you're gonna want to swallow", "This girl rubs her meat before she sticks it in", "Shut up and eat my meat", "My meat is 100% going in your mouth today" (Figure 2), and "It's a sin to get my sauce on your chin" (Funny aprons for men - this girl rubs 2021, Once you put my meat 2021, BBQ Apron Funny Grill Aprons for Men 2021, Sauce on chin 2021, Shut up and eat my meat 2021). Within societal norms men have not done much cooking in the kitchen. However, when it comes to barbecuing there is a clear and distinct gender divide about where a woman's place is.



Figure 2. Masculinity In Advertising

Note. Amazon advertisement of BBQ apron

Whether it is the apron industry, game day television commercial with backyard BBQs or tailgating, it's clear the advertising industry thinks only men can be summoned to the grill. Plant-based foods like Impossible™ and Beyond Meat® burger patties do not weaken or take away from the BBQ experience, the masculinity of men nor does it serve the female population. If anything, plant-based burgers, chicken patties and hotdogs and sausages demonstrates a real grill master's talent, or lack thereof. I can attest to the countless, meatless burgers and plant-based hotdogs that have been winced at, burnt, dried out and thrown away by the men grilling the food. BBQ proteins for the cell-based meat industry have not yet come to fruition, though R&D is in the works. Last year Texas based, BioBQ announced they “want to be the first to grow cell-based Texas BBQ”, their R&D differs in that BioBQ will grow meat which will detach from the scaffold it is grown on (Gruver, 2020). The concept is to capture BBQ meat attributes; tender meat falling off the bone, something which has not been done. I think it is these kinds of images and ideas that would aid in future advertising.

ADVERTISING AND REGULATIONS

To date, marketing and packaging ideas have not been touched upon for cell-meat and ag, companies are still engaged in finding ways to market and package foods. Challenges in regulations, continue to be in the infancy stages. In 2019 the intergovernmental panel on climate change (IPCC) recognized and addressees the cultured meat industry. However, the IPCC is looking at the cultured meat industry to be used in aiding Third World countries with limited resources instead of everyday consumers in first world countries (Lynch & Pierrehumbert, 2019). Scientists and researchers mutually agree, there is no hard data for mass production of any kind of protein or cellular agriculture. While this sort of technology would work to aid third world countries, scientists concede cultured meat and cellular agriculture are still in the infancy stages,

meaning, scientists, and R&D groups are continuously adjusting and looking for new ways to grow larger pieces of protein. Other challenges are finding regulatory framework for how cell-based products should be labeled for food safety (Cameron & O'Neill, 2019; Lynch & Pierrehumbert, 2019). One small breakthrough came on December 1, 2020, when American based, Eat Just made history as the first company to received Singapore's approval for the first, regulated cell-based chicken bites to be served at one of the island's restaurants (The Guardian).

Companies which do not have products on the market continue to share images and recent developments on their website and in the media. Mosa Meat shares a visually stimulating burger made from a living cow (Figure 3). The company website also includes frequently asked questions (FAQ) along with questions and answers (Q&A) for audiences less familiar with cell-based proteins. Mosa Meat also shares a YouTube video with Chef David Chang on Jimmy Kimmel Live.

During the introduction Kimmel had difficulty addressing the topic, sharing how he thought it (cultivated meat) “seems very creepy...some of the meat that they're growing” (Kimmel, 2021). I think the public should consider foods that are unfamiliar on a menu and during discussions. We are quick to make judgements about it, especially foreign cuisine. Kimmel's response about cultivated meat being creepy is exactly why I chose metaphors as my platform. It assists us to negotiate and express ourselves when we cannot find the right words. Chang acknowledged when he learned more and tasted the (cell-based) chicken that his mind changed. Chang also announced on Kimmel that he would share cell-based foods on his show, *The Next Thing You Eat* on Hulu.



Figure 3. Mosa Meat

Note. Cultivated beef hamburger (*Mosa Meat Press kit*)

Nisbet (2012) shares that news about cell-based proteins only spans as far as the audience members who are already informed and engaged with it. Advertising today is nothing like it was ten years ago. Television commercials, newspapers and radio advertising are as obsolete as the platforms they are on, unless the audience members are baby boomers (boomers). The public is more likely to see or hear advertisements through technical communication platforms (information sharing, Instagram, Spotify, podcasts, TikTok, and between Netflix and Hulu shows). The negative side to technical communication is that consumers can be so over saturated with information; they pay less attention or disregard it altogether. No matter the kind of information or advertisement, humans are likely to do one of two things with data; ignore it or invest in their self-interest with competing claims (Nisbet, 2012). For example, the Impossible™ burger launched in 2016 at Momofuku's in New York, and then rippled with a chain of popular fast-food restaurants over the following three years. However, it was not until Burger King's 2019 announcement that the rest of the world learned of the Impossible™ burger. Later that same year, Impossible™ answered the wishes of plant-based eaters, and introduced Impossible™ meat into supermarkets (Yeung, 2019). Then on June 23, 2020 café giant Starbucks introduced the Impossible™ Breakfast Sandwich (New, delicious Impossible™ Breakfast Sandwich now available at Starbucks in the U.S. 2021).

To date, Eat Just is the sole cell-based company to get regulatory approval overseas. It was no mistake when Eat Just partnered up with 1880, Singapore's trendy establishment that is anything but a traditional restaurant. 1880 (2021) is a members only social club built on a collage of diverse patrons, food, entertainment, libations, yoga, spas, meditation, and provides a podium for open conversations, and idea sharing. 1880 and Eat Just are perfect for each other, the popular, eclectic, well rounded club contributes a modern, synergistic venue for the cell-based

chicken bites on the menu. It is the beginning of what will be huge movements to combat climate change. Trendy, upscale restaurants like 1880 in Singapore are on board because they understand the positive ethics and sustainability behind the cell-based chicken bites (*The Guardian*).

THE CLIMATE CRISIS

Environmental activists have also found new ways to frame issues related to the climate crisis, and as a result make it relatable and digestible for everyone regardless of the generation gap. At the beginning of the 21st-century politicians, in an effort to minimize the climate crisis changed the conversation from global warming to climate change (Lakoff, 2010). Environmental leaders like Leonardo DiCaprio, Matt Damon, Ellen DeGeneres, Prince Harry and Greta Thunberg are proponents to combat the climate crisis. The word combat used with the word climate brings gravitas to the discussion. Thunberg makes it a point during every interview to use the words climate crisis to reinforce the truth that we are in a crisis. Due to that truth. Lakoff and Johnson (1980) make an argument for how we as humans have the wherewithal to position ourselves above or “over animals and plants”, and the ecosystem to control the environment and fix or at the very least mitigate the human impact.

There’s no need to participate in climate change, the world has already done that. In fact the climate has changed for the worse. Since we have changed the climate, we now have a climate crisis. The climate crisis changes the role, actions and how people respond to the environment. Moreover, it changes what the environment will look like for future generations. It gives us a sense of urgency and in urgency movements can be generated. Actor, Robert Downey Jr. (RDJ) is participating in the conversation as well. He is the founder of a YouTube channel called Footprint Coalition. The channel is used to maintain an open and ongoing dialogue about everything environmental. It is a coalition of people dedicated to “scaling down technology to

restore the planet and invest in the growth and sustainability focused companies” (Downey, Meatless 2021). He also introduces one of his shows with a short, animated video about cellular agriculture and briefly explains biotechnology and tissue engineering.

Distinguished actors and actresses, singers, Michelin chefs, famous athletes, television personalities, TikTok’ers, YouTubers, influential radio heads and DJs are the public figures who can pose the greatest impact. The populous of celebrities already involved with environmental actions, animal welfare and food scarcity in third world countries could come together for one of the largest food campaigns ever. If cell-based companies reached out and invited them to taste the cell-based proteins, it is conceivable celebrities could partner with, endorse, and campaign for them. By leveraging their platforms public figures can be the catalyst for change. We know the power they have. Their influence has easily been proven during protests and political movements in recent decades. Time and again social media platforms garnered awareness and recognition for many issues that have long been overdue. The potential for cell-based proteins is viable. It is a product destined to become the next global food trend.

During the past year and a half of an active pandemic, society more than ever has been focused on television streaming platforms, social media and journalism. In that short time period, more and more companies across the globe have taken appropriate steps for environmental sustainability where packaging, marketing and resourcing is concerned. Some make-up companies like Kylie Cosmetics are going vegan, small businesses and corporations are focused on cruelty free research. Stores like Ikea have partnered with the World Wide Fund for Nature (WWF) and non-governmental organization (NGO); in an effort to carry sustainable and ethically sourced goods. Other companies have gone the extra mile to decrease and change packaging in order to minimize waste. Companies like Upside Food are using their website to

promote the cell-based meat conversation. It reads, “Meat made the modern way”, implying this is the new normal, or what will be the new normal. I have spoken with many people over the years about cell-based meat and only one was familiar with it before speaking with me.

In the current food movement of organic, holistic, and natural food choices, it seems like it would be easy to share the idea of cell-based meat and ag. Cell-based food is the new architecture on the horizon of the overall protein and food industry. The idea is not to take over or do away with the conventional protein industry. There will always be people who want conventional, livestock meat, or game meat like small birds, game proper and big game (Rogers et al., 2021). What if conventional protein could be streamlined to assist with net zero goals? By that I mean farmers could stop using CAFOs and farmhouses and shift entirely over to Certified Humane®. They could aid greatly in decreasing greenhouse gasses (GHG) and use less land and water. Sickness, diseases, and bacterial issues could be curtailed by cultured meat (Tuomisto, Hanna, and M. De Mattos 2011). Unused land could potentially be returned to nature, wildlife organizations could facilitate land conversions, or land could be turned over to contribute to the growing demand for organic roots, vegetables, and fruit. Cell-based proteins will mitigate the use of livestock by contributing to the demand for meat consumption. As a result, cultured meat will assuage foodborne and human diseases and create a healthier human population (Post 2012).

DEGREES OF SEPARATIONS

The idea of cell-based meat and ag goes several layers deep to not only change the way we grow food but to change the way we grow fur, leather and even wood. When I share with people what my husband shared with me five years ago, I usually get a surprised, interested, and practical response. While cell-based meat and ag companies are developing proteins in a modern, natural way, the lack of knowledge about the industry seems to be the only thing holding back

not only meat eaters, but animal, nature, and environmental lovers. It also caused me to think about the way in which the animal is killed. Not that I had not thought about it in years past. We are so far away from the animals we eat and the place in which they are kept; it keeps people from thinking about how they are unethically raised and tragically killed. While many may have different perspectives on this, I think most would agree; if they witnessed the slaughtering of a cow, the visual image with sounds and smell, it may cause most to think differently about the protein on their plate. Moreover, in decades past, calves were killed because of cheese making. Yes, you read that right. Thousands of calves were, and many continue to be killed annually before they are a month old. The fourth stomach of a calf produces rennet, which is used to make cheese. Let's be honest, people know time is money, it is a valuable commodity, so much so that it takes precedence over ethics (Lakoff & Johnson, 1980). In fact, that very metaphor (time is money) reinforces human miscalculations and initiates an ill calibrated moral compass. Farmers are not going to take the time to humanely sedate the calf to pull the enzyme. Instead, the calf is murdered alive as the stomach is sliced open.

The degrees of separation between the animal, the market and the kitchen table are so great, that the lives of animals are never considered or thought of. Most do not think about the living experiences of the cow (pig, duck, etc.); there is no direct contact with the animal(s). Consumers looking for protein in the market do not see a face, the warmth of the fur and body or breath associated with the protein they pick. The blood lingering on the white styrofoam can be seen through the plastic packaging; still leaves consumers void of any sympathy for what has happened to the animal. Rather, they associate the flesh with a shade of red the protein should be. The marbling of the flesh to be indicative of the quality and refer to the blood as juicy. Such characteristics seem to be negated when people hear the word cell-based meat. In conversations

with people, the response comes with the assumption, cell-based meat is not real meat. Saying cell-based meat is not real meat is to take an intellectual position to say sandwich meats, brats, breakfast sausages, spam, and Vienna sausages are not real meat. They are all products and by-products of meat which have been taken apart from their original form, ground, processed with preservatives and re-shaped into squares and circles to fit between two pieces of bread. Cell-based meat is meat from an animal, it is intentionally shaped and flavored, however it is not highly processed in the way bologna, hotdogs and sausages are.

My own circle of family and friends respects my personal eating choices and I respect theirs whether they decide to eat cell-based or non-cell-based proteins in the future. My husband is a huge protein eater and I have supported it by helping to find the most ethical and certified humane proteins for him. Unlike some of my other non-meat-eating peers. I'm not against the act of eating meat. I am against the cruel, unethical, and inhumane ways livestock are contained and raised for their entire lives. I am against the unethical and environmentally damaging conventional farming architecture. Cell-meat and ag has the continuum to be the humane and ethical food architecture.

CHAPTER III

METHODS

I began researching cell-based meat in 2017, to date the subject continues to be peppered within food conversations, but overall remains off the radar to the general public. The subject at best is mysterious, unknown to most and remains unadvertised. My corpus is not made up of television commercial transcripts, magazines and traditional newspaper ads, unfortunately they do not exist. In an effort to stay on par with research advances, part of what I examined were cell-based food company's websites. I put myself on several company email lists where I have gained access to and gathered papers, media and journalist's articles, press kits and research reviews. Emails also allow me to keep up with monthly conversations, changes in research and new findings for cell-based meat. From time to time I search the internet for other media sources, interviews and videos. I was interested to find cell-based protein conversations taking place on America's syndicated Elvis Duran and The Morning Show, and on Robert Downey Jr.'s (RDJ) YouTube channel Footprint Coalition. While several studies have been conducted looking into the subject of cell-based meat, and how it can benefit the environment, animal welfare, human health and sustainability; only a few scholars and researchers like Bryant and Dillard (2019), Datar (2021), Hocquette et al. (2015) and Loo et al. (2020) have explained how people (the general public) think about and discuss cell-based meat.

To help better understand perspectives and knowledge on cell-based proteins, I created a thirty question, anonymous and voluntary online survey of U.S. participants. Using the generational categories from Pew Research Center, of the 153 participants an estimated 41 were Gen Zers approximately 30 were millennials and the rest were Gen X and boomers (Dimock, 2021). The answers from the survey are two-fold. First, respondents will help identify what

people think, and the kind of vocabulary, metaphors or rhetoric they use in their opinionated written responses.

Second, to observe how people identify with the kind of food they eat (meat eater, vegan etc.) and what their position is with plant-based or cell-based foods from a moral and ethical standpoint. It was my intention to use a broad brush for my research in that I did not focus on a certain demographic or age group. I did not have a selection criterion either. Most noteworthy; participants were not given information nor were they privy to what cell-based proteins are. They were not given links to websites or materials of any sort. Likewise I did not put restrictions on, nor restrict them from googling information during the process of the survey. The survey did not have a time limit, but they knew the survey would only be open and available for fifteen days. To facilitate my study, I developed an online survey of thirty multiple choice, and open-ended short answer questions. The questions were uploaded to an online platform called, Qualtrics, which provides a link for easier distribution and access. Approximately one hundred and fifty-five people were part of a snowball sample. Part of the sample was from my direct network and I asked Old Dominion University faculty members and graduate assistants teaching classes to distribute the survey to their students. The survey will be used to receive feedback about how the general population, outside of the science discipline, thinks and communicates about cell-based meat and cellular agriculture. It will also identify how much people are willing to spend on food and observe what matters most when picking proteins they consume.

The survey asks the respondents to give cell-based meat a better name or term that makes it more relatable and friendly to them. In essence I am looking for a way to do away with what Datar calls the “Ick factor” (Downey, Meatless 2021). In her interview on the Footprint Coalition Datar explains how packaging usually plays a part in the storytelling of a product. In

all supermarkets consumers are greeted with an array of eye candy in the form of packaged, canned, jarred pantry and frozen goods. However, when it comes to beef, the wrapping is not telling a story; the beef itself is telling a story. Therefore, when thinking about cell-based proteins the narrative must be different, what is the why. Why cell-based meat? The common stories among cell-based sources within this paper all point to three main concerns not in any order: unethical animal farming and livestock welfare, environmental degradations and sustainability, and human diseases and health. Those stories will have to accompany the conversation and advertising of cell-based meat out of the gate. The three-talking points will invite already worthy conversations which may allow for the movement for cell-based meat to be quick and large. Datar goes on to share different ideas about how to get consumers to want to try cell-based meat. To have “global conservation”, she says the most important part has to be in “the storytelling combined with the concept of meat, milk and eggs.” (Downey, Meatless 2021). I thought this was interesting in that people would have an ick factor about cell-based proteins but not with factory farming meats? Animals are raised, fed and slaughtered in such an inhumane and horrific way, that if most witnessed it firsthand, it might make them nauseated. The traditional meat architecture is anything but philosophical. Finally, the survey does not ask for names, demographic or geographic location. It only asks for an age range. For the subjects in my network who pulled the link from my Facebook page, I emailed or texted the survey to. I would never know whether or not they took the survey because Qualtrics is a non-tracking online link.

The purpose of this method is not to defend metaphorical perspectives, rather to observe how metaphors are used to paint a mental picture, change the perspective of cell-based meats and make the conversation around ethically sourced foods more digestible. I think when

“metaphorical expressions are used with appropriate audiences by real speakers in natural discourse” it aids in making a difficult subject more engaging (Kövecses, 2008). In a world led by technology and interconnectedness people have come to use relatable ideas and terms, as a result they better understand, and it causes people to do something that will result in change. For this paper that means to identify with food in order to support or push an agenda. I believe metaphors are an important platform to help explain cell-based meat and ag; a complicated, scientific-based solution which can have positive rippling effects for people, animals, and the environment alike.

Figures of speech like metaphor, provide a direct path in the order of interpretation (Camp, 2006). The order has a direct impact on how a message is interpreted to have a neutral meaning or understood exactly as the writer intends the reader to take it (Lakoff & Johnson, 1980). The order can also lend itself to persuasion in that it changes the mindset of the reader in favor of the thing being argued for. The subject of meat is an extremely heavy and controversial subject and at times requires an order of interpretation. Almost every source I have come across could not be discussed without being coupled with one of the following: the environment, animal welfare, human health, and sustainability.

Metaphors are used not only to get a certain message across, but it rhetorically shifts current thoughts about the meat industry in both the meaning of meat and what it means to choose between animal-based (real meat), plant-based and now cell-based meats (Muhlhauser, Drews, & Reitz, 2021). Throughout this paper the word real is used in conjunction with the traditional protein industry. It's a way to not only define farm raised protein but it also creates a reference point or centerline if you will, to know where the subject of farmhouse raised protein stops and where the conversation for plant-based or cell-based meat begins. For some, using

metaphors may provide a comfortable way to communicate their intentions without outright saying it. As Camp (p. 281) writes it is an “assumption that semantic meaning is conventionally encoded” and as a result the original meaning is severed. Moreover, it assumes the listener to already have the same relatable ideas of communication to decipher what is really being said in the metaphorical statement.

Davidson’s (2011) ideas of metaphor are a means of conveying falsehoods that in addition to dismissing the literal meaning they create confusion and are better suited for philosophic and scientific discourses, which I agree. Cell-based proteins and cellular agriculture are scientific discourses which require some plain language and some metaphors for the message to appeal to the audience. I believe metaphors not only aid in engaging the audience, but it also helps to take a confusing subject and make it more digestible, especially with a subject as expansive as cell-based foods. The topic of protein takes advantage of and leverages issues that are directly related to it. Whether people agree or not, conversations about protein cannot be had without directly linking in the environment, animal welfare, human health, and sustainability.

Think about it for a moment. The alternative meat movement is weaved with humanism and perhaps threads of spirituality; both positions use rhetorical designs for the corresponding marketing and packaging used for meat alternatives (Buchanan, 1995). Rhetorical aims are linked in with the fight for better human health, battling the climate crisis and acknowledges the years of animal cruelty within the traditional farming architecture. Even with plant-based foods; consumers, media, and journalists discuss plant-based meat by echoing what is currently being marketed and written on packaging, websites, or commercials (Broad, 2018). The current obstacle for cell-based meat and ag is there is no marketing or packaging for future consumers to

take in. Unless consumers are looking for it, their only exposure is to search the websites of current R&D cell-based companies. Companies like Mosa Meat, GOOD Meat, New Harvest and Upside Foods offer a page on their website to subscribe to monthly or weekly newsletters and updates in research progression. However, the public's confusion with meat technology lies in the hands of plant and cell-based professionals. Their discourse is a combination of scientific jargon and plain language, leaving the audience with many questions and concerns.

CHAPTER IV

RESULTS

Within the survey there were a total of 13 closed-ended questions. Out of 153 respondents 124 were not in the restaurant, health, or medical fields. Those numbers aid to reflect the opinions of a different demographic not influenced by the food industry or community of the medical professionals. Populations unassociated with those professions may yield more unbiased answers. Areas where unbiased opinions could not be helped, is in the debate over science and nature. Considering the climate crisis, 99% of participants think about the environment (Figure 4). With the that in mind the survey illustrated 82% answered yes to practicing acts for environmental consciousness. Meaning they recycle, use reusable shopping bags, purchase products that use less waste, buy second hand or live minimalistic. Keeping with that theme, the aggregate attitude was at 85% in favor of ethically and sustainably sourced, fair and free trade certified, and certified humane food. 78% of respondents are omnivores; therefore, the research is indicative of meat eaters favoring ethical and sustainable standards also.

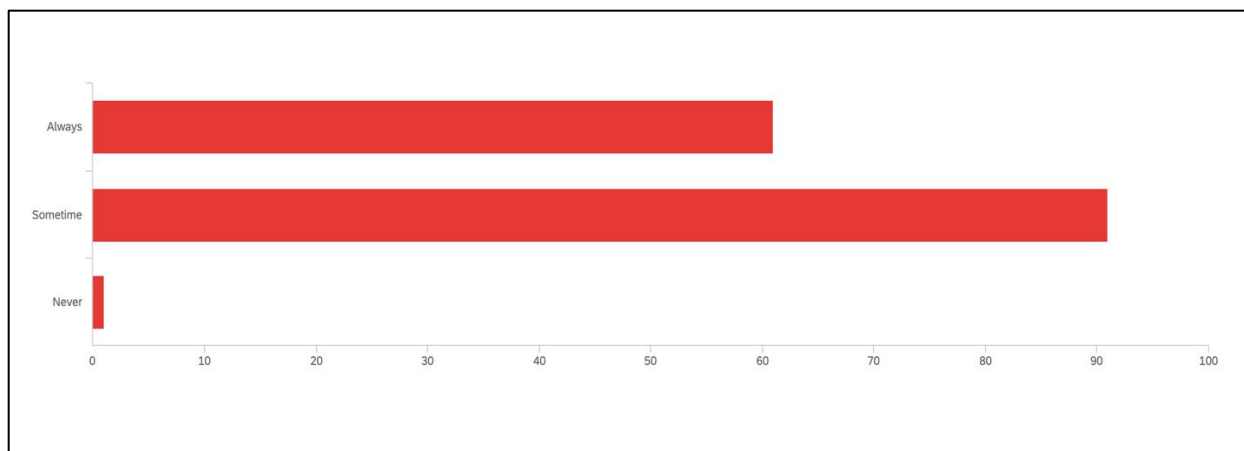


Figure 4. Environmental Consciousness

Note. How often respondents think about the environment

There was a purposeful divide in the survey. Participants were asked to describe the kind of eater they most consider themselves. If respondents chose vegetarian, vegan or plant based, they did not answer meat-specific questions. Meat eaters were given four meat specific questions. A category in the survey referenced meat (protein) in general, then directly addressed steak, hamburger meat, and chicken. Responses in all the protein categories shared price of protein as the number one concern. Other high responses yielded considerations for fat content, cut and oddly enough, willingness to pay for the best quality and healthiest protein. Respondents suggested ethically and sustainably sourced, fair trade and free trade certified, and certified humane foods are difficult to find in less high-end supermarkets, and when found can be expensive. With price being the number one factor in purchasing meat, it was surprising to discover almost one-third of the participants already shop at high-end supermarkets like Whole Foods, Wegmans, Harris Teeter, and Kroger, and use food shipping companies like Fresh Direct (Bolluyt, These are the most expensive (and least expensive) grocery stores in America 2018). Therefore, it is not far-reaching to explore the strong possibility that people will pay more for better quality foods if it is made available to them. By the time cell-meat and ag comes to market and word of mouth pervades favorable opinions, consumers will flock to it the same way they did plant-based foods. Only this time the argument around ‘real’ and ‘healthy’ will be a worthy debate.

A movement familiar to Gen Zers is Meatless Mondays. A question in the survey asked if respondents participate in Meatless Mondays. Positive responses used verbiage which followed: “environmental and health conscious”, “my health and health of the planet”, “health reasons”, “environmental reasons”, “better for the environment”, “welfare status of food animals”, “my health and the environment”. I found meat-eater responses came in the form of defending and

pleading a case for meat: “I need” (to eat/have/increase) “protein”, and others said “meat is a” (good/great) “source of protein”. Some said they felt Meatless Mondays was imposing or implying there must be a “restriction”. One did not feel the “need to enforce a meat free day”, and another does not want to be “restrictive” with meat. Communication about proteins is often approached as an agonizing walk on eggshells. Even behind the guise of an anonymous survey respondents often skirted around their answers instead of saying directly, I like meat and I would not want to participate in meatless Mondays. The survey was not solely aiming for meat eaters. Many non-meat eaters have chosen their lifestyle based on life experiences with animals, for religious and philosophical reasons, and others for genuine concern for animal welfare and the environment. The same was true for me. For some it may seem bizarre; that I would begin plant-based eating based on my philosophies for animal welfare and the environment rather than my own health. I consider myself a healthy person. Athletics and training of some sort have played a part throughout my entire life and still do. That said, if I could eat animal-based foods without an animal having to suffer and die I would, and so would many others. Vegan, vegetarians, and plant-based eaters are not people who are taking some moral high ground. Pragmatically meat eaters and non-meat eaters have much more in common than not.

However, I was not looking for moral commonalities. I followed the “coding units for social organization” to review the data which fell under Groups and Cliques combined with the aspect of Emotion to garner sympathy (Saldaña, 2021). The grouping in the survey was to break out responses between meat eaters (Omnivores, carnivores, pescatarian) and non-meat eaters (vegetarians, vegans, plant-based). Questions in the survey were contrived to garner empathy and sympathy for the animals and concern for the environment. When left to their own thought’s respondents took a strong position for protein and their health. Forgetting or perhaps avoiding

grouping the ideas of livestock and environment together. They had contrary opinions and more ill formulated thoughts about conventional protein. Maybe therein lies the problem. Meat eaters look at their health and protein intake as a separate and individual subject from the current farming architecture and the climate crisis.

Nonetheless, what I found was when the grammatical structure of the question influenced the heart and minds of the respondents. They demonstrated empathy with the unethical and inhumane issues related to animals used for livestock, and concern for the environment. The first time the question was asked it read:

“If you could eat any kind of meat and it taste exactly like the real thing (taste, texture, color, consistency), without animals/livestock being killed and butchered, would you eat it?”

The verbiage of the question negotiated the life and well-being of the animal with the words “kill” and “butcher”. It informed and garnered a moral position from the respondents. Therefore, they answered, “yes” (they would eat it). Their response is a direct result of not wanting to ‘kill’ or ‘butcher’ the animal. As a result, 77% answered yes. When I used the identical question format to ask about ‘animal by-products’ an overwhelming 92% answered yes.

However, when I rephrased the question omitting relatable terms ‘kill’ and ‘butcher’, and traded vocabulary with scientific lingo the responses differed. I asked:

“Whether you know what cell-based meat is or not, would you try it?”

The two questions are asking the same thing. The first question could have read:

“If you could eat any kind of cell-based protein and it taste exactly like the real thing (taste, texture, color, consistency), without animals/livestock being killed and butchered, would you eat it?”

In the end what the respondents are answering for is the same thing. Due to the difference in wording the answers for the second question decreased by over 15%. With that in mind consider how the grammatical structure or the order of interpretation matters when metaphors could be combined in future advertising for cell-based proteins. The arrangement can pose a seamless platform for rhetoric. Other emotional commonalities were with participants who took a position to defend proteins in other written responses, then took a different position in expressing personal concern for livestock animals when asked: What do you think about the meat industry? 72% of participants did not find favor with the meat industry (Figure 5) and 54% said it mattered if their food was ethically and sustainably sourced, fair and free trade certified or certified humane.

One of my participants shared a thought that closely mirrored Shaw and Iomaire (2019) comparative analysis. In their interviews a participant referring to cell-based proteins said, (it is) “interfering with nature...” (p. 1787). In my survey one written response read: “...Either eat the real thing or don’t, messing with nature like that is not a good thing.” Here, the respondent is using the term “messing” as synonymous with “playing with” or “ruining.” However, the fact is poor farming architectures and methods have made a mess of the protein industry and the participants in the survey agree. While they did not respond using synonyms for ‘messing’, the implication from Figure 5 was the same.

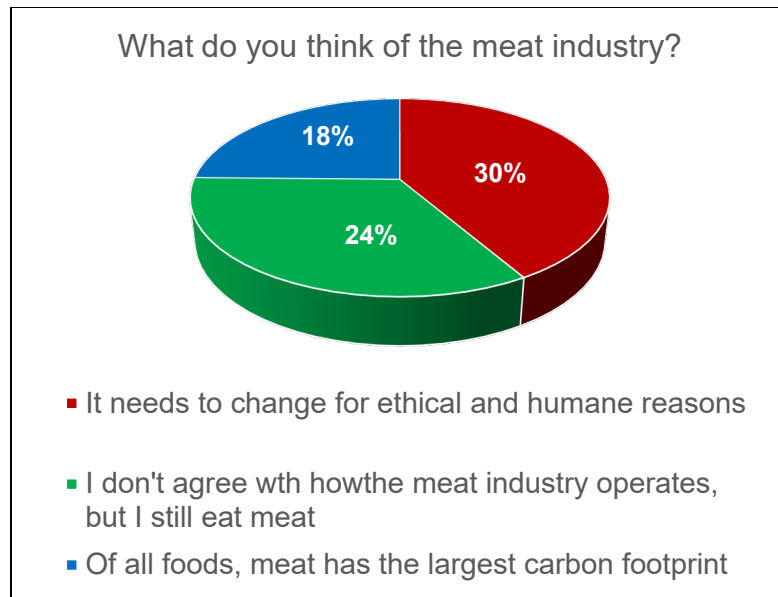


Figure 5. Survey Question

The largest degradation to the environment is meat production. Globally, livestock uses 30% of land, 8% of freshwater, and generates 18% of Greenhouse Gas (GHG) emissions (Tuomisto et al. 2011). 34% of GHG associated with meat production is due to deforestation, methane emission contributes 25%, and 31% is manure waste maintenance (Tuomisto et al. 2011). Concluding, cultured meat will drastically decrease the use of water by 96%, land by 99%, energy use would decrease by 45% and greenhouse gas emissions by 96% (Driessen et al. 2013). Much of the criticism around cell-meat and ag is not applicable and lacks concise knowledge of what it is. This *prima facie* demonstrates the ongoing distrust and presupposition of the ontological science behind the protein. Afterall, humans are conditioned by their cultural experiences and how they understand the “world” with “their culture already present in the experience” (Lakoff & Johnson, 1980, p. 68). So much so they neglect logic and instead assume what they think is not real, perhaps the empirical question is, are cell-based proteins real protein from an actual living cow? The answer is yes.

A portion of the survey asked participants to choose the greatest source of protein from a list of 27 types of foods that included but not limited to: spinach, pumpkin seeds, chickpeas and quinoa. Animal proteins accompanied the list as well and beef still did not come out on top. Eggs did. Between the two beef is higher in protein. I found in conversations that while people know they can get proteins from other food sources. Their preference lies in animal meat. I wanted to explore how knowledgeable meat eaters were about plant foods that are high in protein like beef, chicken etc. I wanted to see if the bias in meat eaters would poke its head as an, I’ll show you that beef is the best protein. Eggs, tofu and pinto beans followed with 30 percent, then legumes (lentils, peanuts and kidney beans at 17%) and seeds (almonds, chia, pumpkin) finished with 9 percent. The survey was peppered with statements like, “meat is a good source of protein.”

The survey was deployed and went live during the first half of December 2021. In the time of a deescalating, transitioning pandemic which has lasted almost two years. Still, my findings in the research and the opinions of participants were similar to the literature throughout the paper. Meat eaters and non-meat eaters shared similar vocabulary and identical word associations as in the study by Bryant et al. (2019) and Shaw et al. (2019). They compiled a list of words their respondents used when they learned about cell-based proteins: “fake, laboratory, unnatural, ethical, sustainable, GMO, disgusting, no hormones” (Bryant et al., 2019, p. 5) In the final question of my survey I asked participants: To give cell-based meat a better name or term that would make it relatable and friendly to you. Rather than give a name, some responses included almost identical vocabulary.

- “...it is not a natural source of protein like from an animal”
- “If it’s fake meat, then why call it meat at all?”
- “Sounds like a science experiment”

Implications from respondents is that cell-based proteins are not ‘real’. If it is not real, then the idea of cell-based meat is metaphorical if they refuse to identify it as the “real thing”. My intention and priority were to give the respondents agency with open-ended questions that would serve the research. Table 2 illustrates three categories of names suggested by the survey participants. Many took ethics and the environment into account. Earlier in the survey environmental perspective showed that 48 of the 153 participants agree that of all foods, meat has the largest carbon footprint, and the farming architecture needs to change for not only environmental purposes but for ethical and humane reasons. 24% don’t agree with how the meat industry operates but they still eat meat. When it came to science discourse, surprisingly several respondents offered names which kept the words cultivated, cell and cultured in the name. One

of my favorites could be used as an advertising slogan: “Meat made for you by people like you” (with a hashtag) #savetheanimals. In my opinion, I think this is exactly what consumers need to read and see in advertising and propaganda. It reflects the modern food movement. Consumers of the same can relate. Above all it assumes a semblance of community, culture, and resilience of a struggle much bigger than them. Some suggestions-maintained science vocabulary in the name.

The names in terms of branding accounts for some approval from participants. In so much as calling it fake and lab or maintaining a name equivalent to science discourse; collectively they used the word meat in the name. Loo et al. (2020) discussed labeling preferences, identifying if alternate meats (lab-grown and plant-based) “should be labeled as ‘beef’” vice just meat (p 10). In my survey, besides when specifically asked about beef, participants never used the word ‘beef’ to refer to any proteins. Only the word ‘meat’ was used in their personal written opinions.

Table 2. Participants Name Cell-Based Meat

Whether participants knew what cell-based meat was or not. Below are the names they would give it to make it more relatable and friendly

Names which take animal welfare and the environment into account	Name that maintained a science discourse	Metaphoric names
Monk Meat	Cultivated Meat	Fake Meat
Humane Certified Meat	Cell-conscious Meat	A science project
Ethical/Ethically grown Meat	Cultured Meat	Maybe-meat
Clean Meat	Cell-based Meat	Lab Created Meat
Humane Meat		
Cruelty-free Meat		
No-kill Farming		
Animal friendly Meat		
Environmentally Friendly Meat		
Next-Gen Meat		
Animal-free Meat		
Neat Meat (as in tidy)		
The Better Alternative		

CHAPTER V

DISCUSSION

Cell-based companies (ex. Upside Foods, Mosa Meat) have websites, Instagram and Facebook accounts. Future consumers and skeptics can read, scroll, and see what cell-based proteins look like. Cell-hamburger patties look like the same patties in the supermarket, chicken strips and bites also. Each company provides readily available and accessible press kits. In the research I found there is no traditional advertising for cell-based foods. The companies utilize journalism, social media and YouTube. I am confident the intention of public relations is to generate and deliver commercials, sound bites and ads in the future. Traditional advertising usually takes place before a product comes to market. Visual rhetoric in advertising presents what products look like in and out of the package. It generates curiosity, conversation, social media sharing and googling. Googling has become part of the modern lexicon and it is a part of the advertising process. Google is where consumers and metaphors meet. Advertising visuals, marketing slogans and catch phrases yield comprehensive results. Maintaining the utilization of a metaphoric schema is an efficient method to bring the science discourse of protein technology to the public.

NON-MEAT PROTEIN SOURCES

The survey provided a great deal of agency for survey participants and because it did, some meat eaters implied animal meat was the only protein they could intake. Debates over proteins usually stand on the premise that vitamin B-12 can only be obtained from animals and therefore non-meat eaters are incredibly deficient in B-12, but I disagree (Antony, 2003). Old studies from the 70s and 90s by Dr. Dean Ornish (1996) are partially relevant in the sense that meat is the primary cause of human health problems like heart disease and diabetes, however

other parts of his research are obsolete in nature. Here's why I share that opinion. Ornish (1996) shares, to obtain B-12 people must consume eggs, nonfat milk, yogurt, and multivitamins. Most countries worldwide consume insects with few exceptions including the U.S. and Europe. Though I would argue insects are slowly weaving their way into American cuisine and snacks and the trendy food movement. Here is where technology, metaphors in advertising and communication connect. Cookies made of crickets are marketed as Chocolate Chirp Cookies. Do they really chirp? No but it is a careful path for advertising. Other items on the market include granola cricket snacks and cricket tacos are some other food trends on the horizon. Crickets, grasshoppers and other insects contain B-12, however crickets are more popular because of their nutty taste. This conversation is critical because it emphasizes another protein alternative and as a result can assist in curbing meat intake. In a 2016 study crickets were among a few insects that were shown to be nutritionally equivalent in protein compared to beef, chicken and pork (Payne et al., 2015). This relates back to the survey topic of non-meat proteins. A question related to food sourcing probed into the knowledge consumers have about non-meat protein sources (i.e. fruits, nuts, vegetables, roots). Observing responses of the survey I had to consider that some participants may have googled protein sources. The purpose behind the question was to investigate the knowledge of meat eaters and non-meat eaters. The relevance is because Gen Zers have plant-based food luxuries available to them that the generations before did not.

Fact is that beef has no benefits that non-meat eaters cannot gain from other sources. Legumes offer nutrition, balance in other parts of the body and are closely equal in protein (depending on serving sizes between the two) as beef. For that reason, legumes are the main alternative protein resource for non-meat eaters. Moreover, legumes are multifunctional. They aid in lower cholesterol, balancing blood sugar, and regulating bowel movements among a

myriad of other benefits (Dietary fiber: Essential for a healthy diet 2021). When it comes to nutrition and health what does that mean, and are we as concerned with it as we like to think we are. No matter what you eat or drink you are only getting one of two things from it. Medicine or poison. That is the rhetoric behind food health and consumption. Verbiage which boasts a better, healthier longer lifestyle or catch phrases like brain-health, brain-food, it's good for your body, are metaphorical rally cries summoning today's generation to not only look at food differently but to identify with it. What it does is it indirectly communicate the question to consumers, what can this (insert food type or dish) do for me? Food choices do not guarantee healthier longer lives.

WHAT IS REAL?

Skepticism in cell-protein and ag is understandable and I can personally relate. When my husband posed the question to me five years ago: "If you could eat meat without an animal having to die..." I thought he was trying to joke with me. In my mind it was inconceivable to think of meat production without the plight and demise of a cow. Burke (1969, p. 14) said it best, humans are "a rational animal." Meaning there is an order to how I rationalized my husband's statement. My logic was based on how I have been conditioned to think about proteins and my knowledge about proteins up to that point. At first, I will admit the concept seemed impossible. However, the question also inadvertently aligned with my personal philosophies and later mapped a new way of thinking. Sure cell-based proteins can be an abstract concept. But where is the question of realness when purchasing or consuming hot dogs, imitation crab, an Oreo cookie, or lemonade. Are they real, nutritious, and healthy? Cell-based proteins are as real as an in-vitro baby is human. Just because scientists stepped in to facilitate anatomical steps does not diminish the realness of the human baby. In the case of cell-based proteins a bioreactor acts as a

metaphorical surrogate for the animal. In the end it is real protein from a real animal, just like a real human is born from a surrogate. The essence of real food in society is an adapted, made-up construct of the value we put on food since the industrial revolution. Regardless of the push back from hard core meat eaters or the clamor of meat lobbyist cell-based proteins will come to market. Magazines and commercials will present a cell-based burger which will be visually indistinguishable from traditional burgers (Figure 3). When it does, the end results will yield a new protein which looks and will have equal representation as current proteins. Ultimately consumers will be left to their own devices to choose it or not. Moreover, people do not get hungry when looking at the animal (cow, pig, chicken etc.). Society undeniably expects bright red meat in tightly wrapped packages. If cellular meat provides this, then will people really resist it if it didn't come from a slaughterhouse?

Scientists struggled greatly with trial and error before the first cell-based protein was grown and ready to taste. The struggle lies in Fetal Bovine Serum (FBS) and extraction process. It literally defeated the reason for growing cultured meat, citing the objective is the preservation of animal welfare. To eliminate the slaughter of livestock. To date R&D has taken many hits due to the great controversy behind FBS. Up until a few years ago Mosa Meats was growing cultivated meat using FBS. Earlier when scientists studied the muscle and adipose tissue to determine muscle growth, they noticed the muscle growth was paramount amid the fetal process (Bonnet, Cassar-Malek, Chilliard and Picard 2010). FBS worked but was extremely gruesome and contentious. FBS was taken from the slunk (unborn calf) during the second trimester. The immature fetus is taken during the slaughter of the pregnant cow and the FBS was extracted from the heart of the fetus (Van Der Valk, Mellor, Brands, Fischer, Gruber, Gstraunthaler, Hellebrekers, Hyllner, Jonker, Prieto, Thalen, and Baumans, 2004). FBS is no longer used by

any of the current labs that produced meat for tasting (Ahuja 2014, Messmer et al., 2022, Paul-Gera, 2022). Scientists have migrated to using embryonic myoblasts, also called satellite cells or adult skeletal muscle cells (Sharma, Shruti, Sukhcharanjit, and Singh 2015). Embryonic myoblast is the initial growth of muscle tissue in an animal. The cells are grown using the scaffold-based technique for muscles adhere (Sharma et al., 2015).

Moving forward, I personally found in my interactions with people, if I was less technical and offered less description in my explanation about cell-based foods, people were far more receptive and freer to discuss it. Which contrasts with the way cell-based meat and ag is referred to in peer review journals and the food industry where terminology is far more technical. While the research for cell-based foods goes back centuries, it was only 17 years ago when one of the first peer review journals was published about “in vitro-cultured meat production” co-authored by Methany of New Harvest (Edelman et al., 2005). Scientists, researchers, and technicians within the lab-growing food industry make great use of plain language by leveraging the media and journalism. Companies like Mosa Meat, Upside Foods, Beyond Meat®, Impossible™, New Harvest, and many others have given several interviews over the years. In each interview it is a priority to clear any misconceptions about lab-grown meat and address ethical issues where animal welfare is concerned.

In a recent TED Talk Datar shared how much of the population is already consuming cellular agriculture products. Yup, you read that right. In fact, if you are an animal lover and enjoy cheese; remember the story about the calf?

“We already consume cellular agriculture products every day in our lives, in super small quantities. Several vitamins, flavors and enzymes are already made in cell cultures. In 1990 a cell cultured version of rennet hit the market, a version of the key enzyme called chymosin.

Today 90% of rennet used for cheese-making comes from a bioreactor instead of a calf. You can also buy real dairy ice cream that was produced by cellular agriculture” (Datar, 2021).

How willing are you to eat cell-based anything? Her statement is exactly how the future of cell-based foods will make its way into the market slowly. Companies are gradually integrating cellular ingredients into their products. Which falls in line with the opinions of participants in the survey. They were forthcoming in their concerns for health, animal welfare and the environment. Consider this. Cells taken from one, single cow, one time, would provide enough steak and hamburger meat to feed hundreds of thousands of people and that is a modest estimate, it is much more. The same results will come from a one-time extraction from one chicken, one pig, one lamb, and on and on. Contemplate the aggregate scale cell-based food and agriculture can provide, furthermore it has the necessary gravitas to facilitate environmental sustainability. There is no question of whether it is real. It is. No reservations about ethics, it is morally sound and sustainable.

SURVEY CONNECTIONS

The basic knowledge about animal characteristics is so limited that when we talk about inhumane practices, what are we referring to specifically? Eggs for example come, caged, cage-free, free-range, organic, non-GMO, certified organic, vegetarian fed, pasture raised and certified humane. What does it all mean? Truth is some respondents did not know either, one wrote, “No I don’t even know what that means.” I will share none of it means what we think, the labels are extremely misleading, and hens do not live a normal life. Certified Humane® shares how the words ‘Pasture-Raised’ means nothing. It is advertising rhetoric to stimulate a humane visual idea of a perfectly healthy hen on a pasture. Marketing executives use buzzwords that in an instant gratification culture stimulates a quick mental image which equates an ‘us and them’

mentality. While consumers are in the quick grab and shop mode, the message Pasture Raised registers as: 'safe for hens and healthy for me'. Fact is any company can slap those words on egg cartons and packages for marketing. Another tactic, labels that read, "no antibiotics" or "no hormones" on egg cartons. Those companies are not taking any extra step because they care about the hens, but that is exactly what they intend to communicate to consumers. Certified Humane® writes how antibiotics and hormones were federally banned for poultry over 50 years ago. For that reason and more it is important to talk about farming architectures. To connect this back to the survey, responses and written opinions by and large targeted unethical and inhumane treatment of animals:

- "I won't eat certain things I personally think are unethical like veal."
- "I do stay conscious of certain companies who have been found guilty of animal abuse through productions"
- "I do care and try to purchase items...from farms that follow more strict humane standards."

There is no miscommunication, there is no misunderstanding how giant corporations are intentionally manipulating the public. They dominate the egg and protein markets nationwide. It is incumbent upon the consumers and the public to educate themselves on food labels. The last thing I will share is if consumers want eggs from an ethically raised hen you can rest with a clear conscience that Certified Humane® Pasture-Raised hens is the way to go. The hens consume all things Mother nature, have perches, nests, an area for dustbathing, water and can flap their wings with normalcy. Bottom line. If you want anything certified humane it cannot be regulated by the USDA with their conscienceless low standards. If you want to know more you can google: Humane Certified how to decode egg labels (Humane®, How to decode egg labels 2018).

CHAPTER VI

CONCLUSION

In other studies, about cell-based proteins, the researchers were looking for word associations used to describe what people thought about cell-based meats. However, there was a point in each of the studies when participants were told what cell-based proteins were. Though I am not sure the extent of details shared. My research shared new information with regards to the perspective participants had about cell-based meat. However, shortfalls in the study involved information sharing. I did not explain or give examples for what cell-based proteins are, where they are derived from or how it would serve the environment and livestock. Leaving out critical details that could have given context to the questions was not in the best interest of the participants. Unsure of what cell-based proteins are, the lack of material deprived the research of extra data which could have otherwise changed many answers and provided more informed written opinions. However, I do believe some participants used Google to search for what cell-based meat is. I feel whatever they read on Google did not give them a simple explanation and therefore there was not only a communication gap but a misunderstanding altogether; based on their responses.

Currently cell-based proteins are not well-known but in the next 10 years it will be. Within the next 20 years it will transition from being a new thing, to a trendy movement to being just another choice of protein that we choose from. By the 25-year mark it will not be a conversation anymore. I think by that point there will be a lot of studies questioning whether cell-based proteins and foods are improving or worsening human health. I wonder what studies will show about animal welfare and if the environment is improving. Will it help meet net zero

goals? Will traditional farming architectures change? Will livestock farmhouses be more humane?

Cultured meat may be incongruous, and it goes without saying, there is always an adjustment period when new science, research and technologies are introduced. There was a time when the public was against, heavily questioned, and criticized skin grafting, surrogacy and in-vitro fertilization. However, once people saw the medical benefits, they became accepting of it. Today such topics are hardly controversial. If anything, people now more than ever rely on those methods for quality of life and growing families. Cell-based foods will run its course, the idea, while uncommon, has realistic outcomes. As Driessen Weele and Driessen (2013) demonstrated in their study, once people become educated about the new research, society will begin to adopt the ideas and assumptions associated with cell-based proteins. Some participants in the survey were knowledgeable about cell-based proteins and some were not. Nevertheless, most participants said yes to trying cell-based meat. Cultured meat will find a normal place in our society, nestled among the great scientific, researched, engineered and technological successes before it.

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APPENDIX A

SURVEY

Survey: Calling all Foodies

Hello. I am a graduate student at Old Dominion University, and I'm requesting your participation in a survey I've created to accompany my thesis research. Your participation is voluntary and anonymous. The survey is a compilation of 30 multiple choices, yes/no questions, and opinionated/idea sections on an online platform called Qualtrics. The survey will be used to better understand how the general population thinks and communicates about cell-based meat and cellular agriculture, the new meat and agricultural architecture on the horizon. No identifiable information will be used or requested, and no compensation is provided for your participation. Thank you in advance for your time and participation.

1. Which best describes you? (circle all that apply)
 - a. Restaurant industry
 - b. Health and fitness professional (PT, food nutritionist, yoga teacher etc.)
 - c. Administration
 - d. Corporate America (CEO, CFO, Directors, manager etc.)
 - e. Gig economy (Uber, Grubhub, handyman etc...)
 - f. Medical field (doctor, nurse, EMT etc.)
 - g. Military/law enforcement
 - h. City employee (social worker, utilities, waste management etc.)
 - i. Student (college, certification, trade school etc.)
 - j. Consumer/General Public
 - k. Other

2. What age group do you fall under?
 - a. 18-29
 - b. 30-39
 - c. 40-49
 - d. 50-59
 - e. 60-69
 - f. 70-79+

3. Which supermarket do you regularly shop at?

 (i.e.: Food Lion, Walmart, Target, Harris Teeter, Wegmans, Whole Food, Fresh Market, Aldi, Lidl, H.E.B., Giant Eagle)

4. Do you consider yourself to be a healthy person?
 - a. Yes
 - b. No

5. Do you exercise?
 - a. Yes
 - b. No
6. What things are you health-conscious about? (circle all that apply)
 - a. The type of food/s you eat (i.e. organic, non-organic, processed)
 - b. Where you eat (i.e. fast food vs. restaurant)
 - c. The quantity of food you eat
 - d. The kind of food you eat most (i.e. beef, chicken, pork, sea food, vegetables etc.)
 - e. Sometimes I'm health conscious
 - f. I'm not health conscious
7. Do you participate in Meatless Mondays, why or why not?

8. How often do you think about the environment?
 - a. Never
 - b. Sometimes
 - c. Always

If you answered "Never", skip down to question number 10

9. Are you environmentally conscious (i.e. recycle, use your own shopping bags, buy second hand etc.)?
 - a. Yes
 - b. No
10. Does it matter to you if your food is ethically sourced, sustainably sourced, fair trade certified or free trade certified? Whether you answer yes or no, please explain why or why not. Feel free to address what applies to you.

11. What kind of eater do you most consider yourself to be? (pick one)
 - a. Omnivore (animals and plants)
 - b. Carnivore (i.e. beef, chicken, pork, duck, etc.)
 - c. Pescetarian (i.e. seafood, fish, shell fish, etc.)
 - d. Vegetarian (plants, some seafood, and animal by-products, i.e. cheese, milk, eggs)
 - e. Vegan (only plants, no animals, no animal by-products)
 - f. Plant based (i.e. fruits, vegetables and roots as close to nature as possible)
 - g. Does not matter, I eat it all

If you answered C or D skip down to question 15.

If you answered E or F, skip down to question number 16

12. When choosing meat, what two things matters the most to you? (Only circle two)
- a. Price
 - b. If it's organic
 - c. Non-organic
 - d. Grass fed-grain finish
 - e. Grass fed-grass finish
 - f. Free-range
 - g. Caged
 - h. Color quality
 - i. I'm willing to pay for the best quality and healthiest meat
 - j. It doesn't matter, I buy what-ever is available
13. What is most important to you when choosing hamburger meat?
- a. Price
 - b. High in fat
 - c. Low in fat
 - d. If it's ground sirloin
 - e. If it's ground beef
 - f. Color quality
 - g. I'm willing to pay for the best quality and healthiest ground meat
 - h. It doesn't matter, I buy what-ever is available
14. What is most important to you when choosing steak?
- a. Price
 - b. High fat
 - c. Low fat
 - d. Grass fed-grain finish
 - e. Grass fed-grass finish
 - f. Free-range
 - g. Caged
 - h. Marbling
 - i. Color quality
 - j. Cut (i.e. prime rib, sirloin, etc.)
 - k. I'm willing to pay for the best quality and healthiest steak
 - l. It doesn't matter, I buy what-ever is available
 - m. Not applicable
15. What is most important to you when choosing chicken?
- a. Price
 - b. If the chicken is non-organic
 - c. If the chicken is organic
 - d. Cage free / Free-range

- e. Low fat
- f. Bone-in
- g. Boneless
- h. I'm willing to pay for the best quality and healthiest chicken
- i. It doesn't matter, I buy what-ever is available
- j. Not applicable

16. Do you eat/drink animal by-products (non-vegan or non-plant-based): milk, cheese, eggs, sour cream, yogurt etc.?

- a. Yes
- b. No

17. Share a short description of what you think the following terms are.

Concentrated animal feeding operations (CAFOs)

Farm-to-table meat

Farmhouse raised meat

Cage free meat or eggs

Free range meat, chicken or eggs

Cultured meat

Cell-based meat

Lab-based meat

18. Which do you think has the greatest source of protein?

Pinto beans	Almonds	Peanuts
Broccoli	Yogurt	Brussel sprouts
Grapefruit	Beef	Lettuce
Lentils	Spinach	Tofu
Walnuts	Quinoa	Kidney beans
Chicken	Kidney beans	Cottage cheese
Eggs	Oats	Avocado
Pumpkin seeds	Brown rice	Hummus
Chickpeas	Tempeh	Turkey

19. What kind of burger do you prefer?

- a. Beef
- b. Chicken
- c. Veggie/plant-based
- d. Bean
- e. Soy
- f. Tofu
- g. Not applicable

20. What does plant-based food mean to you? (circle all that apply)

- a. Gross
- b. Highly processed
- c. It's not real food
- d. Vegan
- e. Vegetarian
- f. Good for the environment
- g. Sustainably sourced
- h. Cheaper
- i. More expensive
- j. Healthy
- k. Unhealthy
- l. Natural
- m. Not natural at all
- n. Fair Trade
- o. Saves animals
- p. I'm all about it
- q. I eat it sometimes, but I still eat meat

21. When referring to livestock used for food, I prefer:

- a. Livestock that is free-range/cage-free
- b. Livestock kept in CAFOs
- c. I do not know the difference between A and B.
- d. It doesn't matter

- e. Not applicable
22. What do you think of the meat industry? (circle all that apply)
- a. It doesn't matter to me
 - b. I don't know anything about it
 - c. The animals are well taken care of
 - d. It needs to change for ethical and humane reasons
 - e. Of all foods, meat has the largest carbon footprint
 - f. The farming architecture is sustainable and has been working for years
 - g. I don't agree with how the meat industry operates, but I still eat meat
 - h. What I do know about it has caused me to eat less meat than before
23. Do you believe the meat industry handles and treats animals/livestock (cows, chickens, hens, turkeys, ducks etc.) responsibly and ethically?
- a. Yes
 - b. No
24. Do you care if the meat industry handles and treats animals/livestock (cows, chickens, hens, turkeys, ducks etc.) responsibly and ethically?
- a. Yes
 - b. No
25. If you could eat any kind of meat and it taste exactly like the real thing (taste, texture, color, consistency), without animals/livestock being killed and butchered, would you eat it?
- a. Yes
 - b. No
26. If you could have animal by-products (milk, cheese, eggs etc.) where animals/livestock were not killed and not inhumanely treated, would you eat/drink it?
- a. Yes
 - b. No
27. When you read/hear the term cellular agriculture, what comes to mind? (Circle one or share your thoughts)
- a. I have no idea
 - b. Vegans

- c. Vegetarians
 - d. Plant-based foods
 - e. Petri-dish
 - f. Laboratory
 - g. All animal by-products
 - h. Share your own thoughts:
-

28. When you read/hear the term cell-based meat, what comes to mind? (Circle one or share your thoughts)

- a. Test-tube
 - b. Technology
 - c. Petri-dish
 - d. Laboratory
 - e. Share your own thoughts:
-
-

29. Whether you know what cell-based meat is or not, would you try it?

- a. Yes
- b. No

30. Whether you know what cell-based meat is or not, if you could give cell-based meat a better name or term that makes it more relatable and friendly to you, what would you call it, or how would you refer to it, and why?

APPENDIX B

PERMISSION TO USE PRESS KIT FROM MOSA MEAT



Peer Review Journal

4 messages

YVETTE HUBBARD [REDACTED]

Thu, Feb 17, 2022 at 9:40 PM

To: press@mosameat.com

Good evening,

My name is Yvette Hubbard but please call me Emma. I'm currently a grad student at Old Dominion University (ODU). I'm in the process of completing my thesis and the one piece of information I can't get, well not without paying some ungodly amount of money, is your peer review article. It is titled:

A serum-free media formulation for cultured meat production supports bovine satellite cell differentiation in the absence of serum starvation.

I've tried going through my school online library but no joy. I've literally been following this story with you guys since I wrote my first paper about cultured meat in 2017 in undergrad. Is there anywhere I can access this without having to pay for it? Please, any assistance you can provide would be greatly appreciated.

Also on your site, I found the Mosa Meats Press Kit. May I have your permission to download and use the photos and press releases in my paper? Per ODU academic guidelines, proper citations and acknowledgments will be rendered to Mosa Meats.

--

Respectfully,
Emma

"Our prime purpose in this life is to help others. And if you can't help them, at least don't hurt them." ~ Dalai Lama

Mosa Meat <press+noreply@mosameat.com>

Thu, Feb 17, 2022 at 9:38 PM

Thank you for contacting Mosa Meat. It's great to hear from you, and our team will get back to you within a few days if we are able to help with your request.

If you are a journalist, we are not offering site visits for the rest of 2021; please get back in touch with us in 2022. For other questions, we will get back to you if we can help.

If you are a student, we recommend having a look through the following resources to learn more about cultivated meat and Mosa Meat's journey:

MM FAQs: <https://mosameat.com/faq>

MM Blog: <https://mosameat.com/blog>

What is cultivated beef: <https://www.whatiscultivatedmeat.com/>

Good Food Institute: <https://gfi.org/>

Life Cycle Assessment of Cultivated meat: <https://cedelft.eu/publications/rapport-lca-of-cultivated-meat-future-projections-for-different-scenarios/>

Sign up to our newsletter to stay informed: <https://mosameat.com/newsletter>.

Thank you,
The Mosa Meat Press Team

Robert E. Jones [REDACTED]

Sun, Feb 20, 2022 at 8:58 AM


To: YVETTE HUBBARD [REDACTED] Mosa Meat <press@mosameat.com>

Hi Yvette -

Many years ago I lived in Norfolk, so ODU is very familiar to me. Yes, you can use items from the press kit with proper attribution [REDACTED]

APPENDIX C

PERMISSION TO USE PRESS KIT FROM UPSIDE FOODS



Press Kit Request
2 messages

To: media@upsidefoods.com

Good morning,
My name is Emma Hubbard. I'm a graduate student at Old Dominion University (ODU) in Virginia, and one of your biggest fans. I'm writing my thesis about cultured meat, a subject I first took an interest in 2017, when you were Memphis Meats. On your site, I found the Upside Food Press Kit. May I have your permission to download and use the photos and press releases in my paper?
Per ODU academic guidelines, proper citations and acknowledgments will be rendered to Upside Foods.

Respectfully,
Emma Hubbard

"Our prime purpose in this life is to help others. And if you can't help them, at least don't hurt them." ~ Dalai Lama


Sat, Sep 25, 2021 at 1:11 PM

Hi Yvette,

Thanks for reaching out. You are welcome to use the images in our press kit if you credit UPSIDE Foods.

Best,
Brooke

[Quoted text hidden]



Brooke Whitney

www.upsidefoods.com

Winner of Top Workplaces 2020 & Best and Brightest Companies to Work For 2019 and 2020

Mon, Sep 27, 2021 at 6:47 PM

This email and its contents are confidential and may be privileged. If you have received it in error, please notify us immediately and then delete it. Please do not copy it, disclose its contents or use it for any purpose.

VITA

Yvette Emma Hubbard
Department of English
Old Dominion University
Norfolk, VA 23529

Yvette Emma Hubbard is fulfilling her academic studies to complete her Master of Arts in English with a concentration in professional writing from Old Dominion University. She is on track to graduate in May 2022. Since 2016 she made the Dean's List twice and achieved LeADERS Silver recognition. She was invited, accepted, and inducted into the Sigma Tau Delta International English Honor Society and the Omicron Delta Kappa National Leadership Honor Society. While at Old Dominion University she was a double major receiving her Bachelor of Arts with an emphasis in international studies and a Bachelor of Science in interdisciplinary studies with an emphasis in professional writing. She was also accepted to Texas Tech's PhD program where she will study technical communications and rhetoric in the fall of 2022.