

MEAT IS DEAD

*Melissa D. Mortazavi**

ABSTRACT

The legal and cultural landscape surrounding meat in the United States is evolving as plant-based alternatives, GMO farm animals, and cell-cultivated meat move from test tube to table. While global demand for meat rises amid environmental, ethical, and resource challenges, cell-cultivated meat emerges as a scientifically viable alternative, offering identical nutritional value without the drawbacks of conventional livestock production. Despite federal regulatory approval from USDA and FDA, multiple states have enacted unusually restrictive laws—including bans—targeting cell-cultivated meat. These are motivated largely by economic protectionism, but also deeper cultural anxieties tied to tradition and identity. This Article argues that food law must incorporate social and cultural meanings of meat beyond safety and economic concerns to effectively navigate emerging food technologies. Ultimately, the cell-cultivated meat controversy reflects a broader cultural conflict, highlighting the complex interplay between law, identity, and food.

TABLE OF CONTENTS

I.	Introduction	114
II.	The Legal Construction of Meat.....	124
	A. Linguistic & Common Law Usage and Origins	124
	B. Federal Statutory & Regulatory Law: All the Cooks in the Kitchen	126
	C. Taking a Stab at Regulating Food: Legislation of 1906.....	127
	D. Modern Regulatory Apparatus	128
III.	Meating the Future: Law & Alternatives to Conventional Meat	131
	A. Alternatives to Conventional Meat: Plants & GMO Animals.....	131
	1. Plant-Based Meat—Impossible!.....	134
	2. Genetically Modified Animals	138
	B. Federal Legal Action and Cell-based Meat	141
	C. State Laws Roasting Cell-Cultivated Meat	145
	D. Companies' Beef with States: Pending Litigation	149
IV.	What is (at) Steak?.....	150
	A. Bringing Home the Bacon: Economic Protectionism	151
	B. Something to Chew On: Food, Culture, & Identities	154

* Lou & Connie Miller Professor of Law, Second Century Presidential Professor, University of Oklahoma College of Law. J.D. Berkeley Law. I would like to express my gratitude to the OU Scholars' Forum and Summer Research Fund for supporting this project.

1. God & Nature	155
2. Tradition & Class	157
3. Eat What you Kill: Meat, Masculinity, & Strength	159
V. Meat is Dead: Killing it Moving Forward	161

I. INTRODUCTION

People love to eat meat. In all but three countries surveyed by Statista in 2022, more than 80 percent of the human population eats meat.¹ However, while the global appetite for meat will likely only continue to grow, economic and resource constraints to increasing livestock production are also on the rise.² The cost of meat to consumers is up.³ Inputs are limited and food contamination is real, land and freshwater are scarce, feed is expensive and volatile, animal communicable diseases are increasingly resistant to antibiotics, and food safety concerns persist.⁴ These issues of resource capacity and attendant economic

1. Katharina Buchholz, *Eating Meat Is the Norm Almost Everywhere*, STATISTA (Mar. 30, 2023), <https://www.statista.com/chart/24899/meat-consumption-by-country/> [<https://perma.cc/4QSW-CRFK>] (indicating that in survey of 21 countries, all but 3 reported over 80 percent of the population eats meat and that even in Hindu-populated India, meat eaters still make up the majority of the population).

2. ORG. FOR ECON. COOP. & DEV. (OECD) & FOOD & AGRIC. ORG. OF THE UNITED NATIONS (FAO), OECD-FAO AGRICULTURAL OUTLOOK 2023-2032, at 192 (2023) [hereinafter OECD-FAO AGRICULTURAL OUTLOOK], https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/07/oecd-fao-agricultural-outlook-2023-2032_859ba0c2/08801ab7-en.pdf [<https://perma.cc/4XX3-7MFP>] (predicting an uptick in global meat protein production of 41 million metric tons by 2032, with high feed and labor costs posing significant challenges).

3. FOOD & AGRIC. ORG. OF THE UNITED NATIONS (FAO), MEAT MARKET REVIEW: OVERVIEW OF GLOBAL MARKET DEVELOPMENTS IN 2024, at 1 (2025) [hereinafter MEAT MARKET REVIEW], <https://openknowledge.fao.org/server/api/core/bitstreams/4e35e57c-cf98-4b2f-9adc-388781b51fae/content> [<https://perma.cc/B4BW-C79Y>] (noting meat prices are up 2.8 percent from 2023).

4. Neus González et al., *Meat Consumption: Which Are the Current Global Risks? A Review of Recent (2010–2020) Evidences*, FOOD RSCH. INT’L, May 29, 2020, at 1, 2 (discussing environmental impacts of meat production versus plant-based alternatives); MEAT MARKET REVIEW, *supra* note 3, at 3 (discussing the largest meat market, poultry, and noting that even where feed inputs were less costly, “highly pathogenic avian influenza (HPAI) continued to pose a major obstacle to maintaining steady production expansion in some parts of the world”); Aviva A. Musicus et al., *Health and Environmental Impacts of Plant-Rich Dietary Patterns: A US Prospective Cohort Study*, 6 LANCET PLANETARY HEALTH e892, e892 (2022) (discussing adverse impacts of meat-based diets on freshwater and land usage).

feasibility would exist regardless of any additional downsides to raising livestock.⁵ However, these challenges are compounded by mounting public concern over the environmental and ethical implications of how the world raises and slaughters billions of animals.⁶ Environmentalists highlight the impacts of livestock and poultry on climate change and natural resources such as water.⁷ Public health experts and economists sound the alarm on how rampant antibiotic use in raising farm animals is increasing resistance worldwide with devastating health and economic impacts.⁸ Slaughterhouses continue to be places of dire labor and

5. See, e.g., Sijing Wang et al., *The Booming Non-Food Bioeconomy Drives Large Share of Global Land-Use Emissions*, GLOB. ENV'T CHANGE, Dec. 2023, at 1, 2 (discussing land-use changes related to expansion of bioeconomy, such as bioenergy and bio-based products, including oil crop production and deforestation for wood biomass).

6. See Buchholz, *supra* note 1; Pablo Rosado, *More Than 80 Billion Land Animals Are Slaughtered for Meat Every Year*, OUR WORLD IN DATA (May 31, 2024), <https://ourworldindata.org/data-insights/billions-of-chickens-ducks-and-pigs-are-slaughtered-for-meat-every-year> [<https://perma.cc/G6F8-T8DN>] (estimating 83 billion animals slaughtered for meat production in 2022).

7. Maria Godoy & Allison Aubrey, *Chew on This for Earth Day: How Our Diets Impact the Planet*, NPR (Apr. 22, 2017, at 08:00 ET), <https://www.npr.org/sections/thesalt/2017/04/22/525113726/chew-on-this-for-earth-day-how-our-diets-impact-the-planet> [<https://perma.cc/P7N6-JSU9>] (detailing that beef, lamb, and goat contribute to climate change through deforestation for grazing land, greenhouse gas emissions, and beef in particular uses 2 to 4 times as much freshwater while also being more inefficient about converting food calories into weight gain); *Agriculture and Aquaculture: Food for Thought*, EPA (Jan. 15, 2025), <https://www.epa.gov/snep/agriculture-and-aquaculture-food-thought> [<https://perma.cc/SMU5-LL4T>] (“Researchers have found that 37% of methane emissions from human activity are the direct result of our livestock and agricultural practices.”); Natalie R. Rubio, Ning Xiang & David L. Kaplan, *Plant-Based and Cell-Based Approaches to Meat Production*, NATURE COMM’NS, 2020, at 1, 7–9 (discussing environmental impacts of livestock as a source of meat protein).

8. See *Antimicrobial Resistance*, WORLD HEALTH ORG. (Nov. 21, 2023), <https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance> [<https://perma.cc/C29X-AGLF>] (“[B]acterial AMR [(Antimicrobial resistance)] was directly responsible for 1.27 million global deaths in 2019 and contributed to 4.95 million deaths.”); *Antibiotic Resistance Is Beefing Up*, NAT’L GEOGRAPHIC (Sep. 26, 2025), <https://education.nationalgeographic.org/resource/antibiotic-resistance-beefing/> [<https://perma.cc/WX29-2LCB>] (“Over 70 percent of antibiotics sold in the United States are given to livestock, including cattle, which translates to significant human health impacts.”); WORLD BANK GRP., *DRUG-RESISTANT INFECTIONS: A THREAT TO OUR ECONOMIC FUTURE*, at xviii, 112 (2017), <https://documents1.worldbank.org/curated/en/323311493396993758/pdf/final-report.pdf> [<https://perma.cc/GJD6-H4FX>] (estimating the global impact of antimicrobial resistance as potentially enormous, “[t]he GDP shortfall would exceed \$1 trillion annually after 2030. In the high AMR-impact scenario, the world will lose 3.8 percent of its annual GDP by 2050, with an annual shortfall of \$3.4 trillion by 2030.”).

working conditions.⁹ Ethicists, religious groups, and common consumers are mobilized by the plight and squalor that many animals face in the context of mass meat production and concentrated feed operations.¹⁰

But the world of meat is rapidly changing: What if consumers could buy meat with the taste and enjoyment of “real” meat, safely, without the same strain on scarce natural resources and “the side of existential worry”?¹¹ Enter cell-cultivated meat, no longer science fiction.¹² With two varieties of cell-cultured meat approved for the U.S. market in 2022 and 2023, three more in 2025, and more in the pipeline, these meats, derived from live animal tissue samples, are now being developed and successfully grown in labs around the world.¹³ The products in development are diverse. Some companies reproduce cells of beef, others chicken or fish, still others the sizzle of pork fat or meaty delicacies as obscure as liver for

9. See, e.g., Matt McConnell, “When We’re Dead and Buried, Our Bones Will Keep Hurting”: Workers’ Rights Under Threat in US Meat and Poultry Plants, HUM. RTS. WATCH (Sep. 4, 2019), <https://www.hrw.org/report/2019/09/04/when-were-dead-and-buried-our-bones-will-keep-hurting/workers-rights-under-threat> [https://perma.cc/3XYL-R7BX] (detailing high rates of occupational injury and labor conditions with life-threatening dangers).

10. See, e.g., Matt Pickles, *The Ethical Arguments Against Eating Meat*, UNIV. OF OXFORD: ARTS BLOG (Apr. 28, 2017), <https://www.ox.ac.uk/news/arts-blog/ethical-arguments-against-eating-meat> [https://perma.cc/JZQ6-9GMA].

11. See Joe Fassler, Opinion, *The Revolution That Died on Its Way to Dinner*, N.Y. TIMES (Feb. 9, 2024), <https://www.nytimes.com/2024/02/09/opinion/eat-just-upside-foods-cultivated-meat.html> [https://perma.cc/BZ2V-QRZL].

12. While there is significant debate over what term is appropriate for these products, this Article uses the term “adopted” in U.S. federal government guidance to refer to meat produced in a lab from cells harvested from the muscle tissue of a living animal as “cell-cultivated meat.” The Congressional Research Service defines cell-cultivated meat as “developed in a lab, grown from a sample of animal cells that does not require the slaughter of animals. Developing cell-cultivated meat involves five steps: (1) taking a biopsy of animal cells, (2) cell banking, (3) cell growth, (4) harvesting, and (5) food processing.” LISA S. BENSON & JOEL L. GREENE, CONG. RSCH. SERV., R47697, CELL-CULTIVATED MEAT: AN OVERVIEW 1 (2023). These products are also referred to colloquially as “lab-grown meat” or “cell-cultured meat.” *Id.* at 11.

13. *Human Food Made with Cultured Animal Cells Inventory*, FDA (Sep. 2025), <https://www.hfpappexternal.fda.gov/scripts/fdcc/index.cfm?set=AnimalCellCultureFoods> [https://perma.cc/LMS4-AE7A] (listing five types of cell-cultured meat that have cleared the FDA regulatory process, one made of pork fat, one of salmon, and three of chicken); see also Dan Flynn, *A New Window Opens for the Emerging Lab-Meat Industry*, FOOD SAFETY NEWS (Dec. 6, 2023, at 17:05 CT), <https://www.foodsafetynews.com/2023/12/a-new-window-opens-for-the-emerging-lab-meat-industry/> [https://perma.cc/Z5B7-JKE7] (reporting that more than 80 companies are developing cultivated meat products).

foie gras.¹⁴ While companies developing these products struggle to mimic the texture and mouthfeel of slaughtered animal flesh, on a nutritional and biochemical level, cell-cultivated meat is interchangeable with meat harvested from whole live animals born of through sexual reproduction.¹⁵ Evidence suggests that cell-cultivated meats may have the added benefit of greater food safety than conventional meat¹⁶ because cell-cultivated meat is not susceptible to diseases transmitted by live animals or contaminated through the slaughtering process.¹⁷

14. *Human Food Made with Cultured Animal Cells Inventory*, *supra* note 13 (listing pork, fish, and chicken-based products); Ben Raab & Wilson Rothman, *Lab-Grown Meat Goes Upscale with Faux Foie Gras*, WALL ST. J. (July 19, 2025, at 10:00 ET), <https://www.wsj.com/arts-culture/food-cooking/lab-grown-foie-gras-vow-db23ab0a?mod=hplistcpo1>.

15. Whatever slaughtered live animal the root cell is extracted from, cell-cultivated meat replicates that molecular and nutritional content. Allison Parshall, *Florida's Beef with Lab-Grown Meat Is Evidence-Free*, SCI. AM. (May 3, 2024), <https://www.scientificamerican.com/article/floridas-beef-with-lab-grown-meat-is-evidence-free/> [https://perma.cc/QSQ6-JRG2] (“[T]here’s no reason to think cultivated meat will be any more or less nutritious than meat from a traditional farm[.]”). The joint oversight of the Food Safety and Inspection Service (FSIS) and Food and Drug Administration (FDA) issued grants of inspection in 2023 and fully cleared for sale specific cell-cultivated meats in the United States. Through their premarket review, the FSIS and FDA concluded these cell-cultivated meats showed no discernable difference between them and conventional meat. *FDA Completes First Pre-Market Consultation for Human Food Made Using Animal Cell Culture Technology*, FDA (Nov. 16, 2022), <https://www.fda.gov/food/hfp-constituent-updates/fda-completes-first-pre-market-consultation-human-food-made-using-animal-cell-culture-technology> [https://perma.cc/ZQ4Y-83A8] (specifying the need to meet both FDA requirements and pass inspection from the USDA FSIS); *FDA Completes Second Pre-Market Consultation for Human Food Made Using Animal Cell Culture Technology*, FDA (Mar. 21, 2023), <https://www.fda.gov/food/hfp-constituent-updates/fda-completes-second-pre-market-consultation-human-food-made-using-animal-cell-culture-technology> [https://perma.cc/7J4T-NXHU] (announcing premarket approval); *GOOD Meat and UPSIDE Foods Approved to Sell Cultivated Chicken Following Landmark USDA Action*, GOOD FOOD INST. (June 21, 2023), <https://gfi.org/press/good-meat-and-upside-foods-approved-to-sell-cultivated-chicken-following-landmark-usda-action/> [https://perma.cc/4PEE-TBTA] (reporting that in June 2023 cell-cultivated meat companies UPSIDE Foods and GOOD Meat received FSIS grants of inspection).

16. See Michael Greger, *Food Safety and Cultivated Meat*, NUTRITIONFACTS.ORG (May 27, 2025), <https://nutritionfacts.org/blog/food-safety-and-cultivated-meat/> [https://perma.cc/DTY9-P37B]. This Article will use the term “conventional meat” to refer to animal flesh harvested from the slaughter of a whole live animal.

17. Currently, production is slow and costly as pharma-grade inputs, high energy costs, and lab conditions are expensive. Jonny Anomaly et al., *Flesh Without Blood: The Public Health Benefits of Lab-Grown Meat*, 21 J. BIOETHICAL INQUIRY 167, 167–69 (2023) (discussing how cell-cultured meat can “reduce the risks associated with intensive animal farming,

Other countries are also recognizing this potential. In June of 2025, Australia and New Zealand joined Singapore and the United States and approved their own cell-cultivated meat for human consumption.¹⁸

While technological limitations currently render much of cell-cultured meat too costly to be a viable market competitor to conventional livestock at this time, this has not stopped investors from betting (big) that cell-cultivated meat will overcome these hurdles.¹⁹ Those flocking to this emerging technology salivate at the long-term growth potential: the obvious demand and market for meat²⁰ coupled with growing consumer interest in less morally troublesome alternatives to conventional livestock production,²¹ the current obsession with high protein diets,²² and the geographic mutability of the production process that may allow

including antibiotic resistance, environmental pollution, and zoonotic viral diseases like influenza and coronavirus”).

18. Australia and New Zealand followed suit in June of 2025, approving its first lab-grown meat product for the Australian market. Nadia Daly, *Lab-Grown Meat Has Just Been Approved for Consumption in Australia. What Is It and How Is It Made?*, AUSTRALIAN BROAD. CORP. (June 23, 2025), <https://www.abc.net.au/news/2025-06-24/lab-grown-meat-approved-for-sale-australia/105448604> [<https://perma.cc/6VNY-9B4S>]; Alyx Gorman, *Australia's First Lab-Grown Meat Will Be on Menus Within Weeks*, THE GUARDIAN (June 18, 2025, at 01:31 EDT), <https://www.theguardian.com/food/2025/jun/18/australia-approves-sale-of-lab-grown-fake-meat> [<https://perma.cc/A7N5-GAHQ>] (discussing a product from Australian company Vow Foods, a foie gras from cell-cultivated Japanese quail eggs).

19. BENSON & GREENE, *supra* note 12, at 5 (discussing commercialization hurdles and scaling issues including texture scaffolding and costly “cell-culture medium, bioreactors, and highly trained labor to operate the bioreactors”); Edward N. O’Neill et al., *Considerations for the Development of Cost-Effective Cell Culture Media for Cultivated Meat Production*, 20 COMPREHENSIVE REVS. FOOD SCI. & FOOD SAFETY 686, 687 (2021) (discussing the high cost of inputs in cell-cultivated meat production).

20. Nevil Speer, *Meat and Poultry Enjoy Continued Demand Growth Despite Inflation*, FEEDSTUFFS (Sep. 19, 2025), <https://www.feedstuffs.com/livestock-and-poultry-market-news/meat-and-poultry-enjoy-continued-demand-growth-despite-inflation> [<https://perma.cc/PPW7-YQ2Z>]; Steve Karnowski, *Ranchers Say Expanding Herds to Take Advantage of Record Retail Beef Prices Isn’t So Simple*, AP NEWS (July 30, 2025, at 22:46 CDT), <https://apnews.com/article/record-beef-prices-supply-demand-drought-350dfe6144dda2c0dc2661da043edd5> [<https://perma.cc/2DXD-9NAV>].

21. Alice Hancock, *Younger Consumers Drive Shift to Ethical Products*, FIN. TIMES (Dec. 23, 2017), <https://www.ft.com/content/8b08bf4c-e5a0-11e7-8b99-0191e45377ec>.

22. Stephen Stone, *The Protein Craze: Florida State University Expert Explains the ‘Why’ Behind a High-Protein Diet*, FLA. STATE UNIV. NEWS (May 8, 2025, at 11:04 CT), <https://news.fsu.edu/news/expert-pitches/2025/05/08/the-protein-craze-florida-state-university-expert-explains-the-why-behind-a-high-protein-diet/> [<https://perma.cc/5MZK-XNB9>].

cell-cultivated meat to be generated anywhere (including urban centers)²³ and regardless of fluctuating weather conditions²⁴ renders the technology a good wager. “No-kill” or cell-cultivated meats appear almost too good to be true—welcome news to animal and meat lovers alike. For those concerned about the environment, antibiotic resistance, and animal rights, this is an opportunity to have one’s steak and eat it too.²⁵ As for the vast majority of the American and global population who eat meat (and may or may not be interested in lofty topics but love cheap BBQ), new ways to make meat could mean that meat remains on the menu and affordable for those who want it.²⁶

As natural resources and farmland grows more scarce, many investors are banking on the idea that cell-cultivated meat will be a useful (and even necessary) alternative to conventional animal husbandry in meeting the world population’s hunger for meat.²⁷ From 2016 to 2022 alone, over \$3 billion was invested into research and development surrounding cell-cultivated meat and seafood.²⁸ Backers to these products vary and span the gamut of types of investors: everything from seasoned large venture capital firms (like SoftBank), sovereign wealth funds, and traditional meat producers and processors (like Tyson, Cargill, and JBS amongst

23. See, e.g., Olivia Wilson, *Top 25 Emerging Lab-Grown Meat Companies Leading the Charge in 2026*, SCISPOT: BLOG (Nov. 15, 2025), <https://www.scispot.com/blog/top-emerging-lab-grown-meat-companies-leading-the-charge> [https://perma.cc/KM4Z-D25Q] (noting Blue Nalu in San Diego and Ivy Farm Technologies in Oxford as lab-grown meat facilities inside of urban areas).

24. See Sally Ho, *10 Reasons Why Cultivated Meat Is the Future of Protein: The Case for Lab-Grown*, GREEN QUEEN (Dec. 16, 2022), <https://www.greenqueen.com.hk/10-reasons-why-cultivated-meat-is-the-future-of-protein-the-case-for-lab-grown/> [https://perma.cc/7FE7-YQA7].

25. See *Grow Meat in Labs to Avoid Growing Crises*, ADAM SMITH INST., <https://www.adamsmith.org/press-releases/grow-meat-in-labs-to-avoid-growing-crises> [https://perma.cc/47LT-2ZJ7].

26. *Cultivated Meat Is Scaled Up—and Its Price Is Dramatically Reduced*, CULTIVATED FOODS (Sep. 14, 2024), <https://cultivatedmeats.org/reduced-prices-for-cultivated-meat/> [https://perma.cc/ABX8-WRG3].

27. Louise Cullen, *Alternative Proteins Attract Investment*, FOOD SCI. & TECH., June 2021, at 44, 46.

28. Fassler, *supra* note 11.

others),²⁹ to market leader billionaires (like Bezos and Gates),³⁰ and celebrities looking to influence climate change and the structure of the food system.³¹ As an industry, lab-grown meat has grown exponentially in value and is predicted to continue its ascent in the next decade.³² Thus, the long-awaited migration of cell-cultivated meat from test tube to table has begun.

Amid this investment influx and various scientific breakthroughs, grassroots cultural and economic anxieties have sparked a legal firestorm.³³ Originating from

29. *Id.* (reporting on investments by SoftBank, Temasek, and sovereign wealth investment by Qatar, as well as Tyson, Cargill, JBS, and Bill Gates amongst others); Christine Zulkosky, *Investment in Lab-Grown Meat Intensifying*, FOOD INST. (July 26, 2022), <https://foodinstitute.com/test-site/focus/investment-in-lab-grown-meat-intensifying/> [https://perma.cc/7MKX-CZ8X] (reporting venture capital investments of \$2 billion in one year and major meat producers and processors like Tyson and JBS); Rachel Roberts, *China Signs \$300m Deal to Buy Lab-Grown Meat from Israel in Move Welcomed by Vegans*, INDEP. (Sep. 16, 2017, at 18:32 BST), <https://www.independent.co.uk/news/world/asia/china-israel-trade-deal-lab-grown-meat-veganism-vegetarianism-a7950901.html> [https://perma.cc/4YBF-ZGCC] (discussing China's investment in cell-cultivated meats).

30. Jeannine Mancini, *Jeff Bezos Invested \$60 Million In Lab-Grown Meat but DeSantis Banned It, Stating Florida Shouldn't Be Forced To Eat Petri-Dish Meat or Bugs*, YAHOO FIN. (May 7, 2024), <https://finance.yahoo.com/news/jeff-bezos-invested-60-million-154500097.html> [https://perma.cc/H8UT-RL45]; Cade Hildreth, *Clean Meat Market: Stem Cell Derived "Clean Meat" Attracts Billionaires*, BIOINFORMANT (Nov. 2, 2025), <https://bioinformant.com/clean-meat-market/> [https://perma.cc/ED32-Q8D3] (reporting on how Bill Gates and Richard Branson, amongst others, are investing in Memphis Meats, a cell-cultivated meat producer).

31. Helen Lyons, *Leonardo DiCaprio Invests in Dutch Cultured Meat Company*, BRUSSELS TIMES (Sep. 23, 2021), <https://www.brusselstimes.com/186327/leonardo-dicaprio-invests-in-dutch-cultured-meat-company> [https://perma.cc/L82V-ZFU5] ("One of the most impactful ways to combat the climate crisis is to transform our food system. . . . Mosa Meat and Aleph Farms offer new ways to meet the global demand for beef while solving some of the most pressing problems of today's industrial beef production." (quoting Leonardo DiCaprio)); Kat Smith, *Celebrity Investors Could Change the Food Industry*, LIVEKINDLY, <https://www.livekindly.com/celebrity-investors-food-industry/> [https://perma.cc/EFJ7-52BM] (providing an overview of the variety of celebrity investments made in cell-cultivated meat and meat-alternatives, including Ashton's Kutcher's backing of MeaTech3D, a cell-based meat company).

32. Attiya Zainib, *16 Biggest Lab Grown Meat Companies in 2023*, YAHOO FIN. (Nov. 1, 2023), <https://finance.yahoo.com/news/16-biggest-lab-grown-meat-071814390.html> [https://perma.cc/E7SH-Y7TL] ("The lab-grown meat market, valued at \$2.3 million in 2021, is projected to reach \$960.7 million by 2030, growing at a CAGR [compound annual growth rate] of 80.7%.").

33. Andrew Jacobs & Emily Anthes, *Who's Afraid of Lab-Grown Meat?*, N.Y. TIMES (Mar. 14, 2025), <https://www.nytimes.com/2025/03/14/science/whos-afraid-of-lab-grown-meat.html>.

states with strong conventional agricultural sectors, these forces view cell-cultured meat not as a panacea for various societal ills, but as a threat to their way of life.³⁴ Shortly after the United States Department of Agriculture (USDA) Food Safety Inspection Service (FSIS)³⁵ and the Food and Drug Administration (FDA) approvals of cell-cultivated meat in 2023, these products became the subject of vehement and unprecedented state-level legal hostility.³⁶ Multiple states responded to the mere possibility of cell-cultivated meat with aggressive new legislation designed to impede or eliminate cell-cultured meat entering their food market. In 2024 alone, legislators in Alabama, Arizona, Florida, Kentucky, Michigan, New York, Pennsylvania, Tennessee, and Texas all proposed legislation banning, and even criminalizing, the manufacture, sale, and distribution of cell-cultivated meat.³⁷ Two states, Florida and Alabama, succeeded in passing such legislation in 2024 criminalizing the manufacture, distribution, and sale of cell-cultivated meat.³⁸ Subsequently, five other states (Mississippi, Montana, Indiana, Nebraska, and Texas) have also enacted some form of a statewide ban.³⁹ The fact that there is neither an immediate economic threat to the conventional meat market,⁴⁰ nor any

34. *Id.*

35. FSIS is a public health agency housed within the U.S. Department of Agriculture (USDA) and charged with protecting “the public’s health by ensuring the safety of meat, poultry and egg products.” *Food Safety and Inspection Service (FSIS)*, USA.GOV, <https://www.usa.gov/agencies/food-safety-and-inspection-service> [<https://perma.cc/R3ZY-BSJ3>].

36. *See infra* Part III.B. Illinois is the only state that has openly taken the opposite tack and is attempting to put government resources toward this fledgling market by creating an Alternative Protein Innovation Task Force to explore how to augment the state’s protein sources, with an eye toward increasing access to food for the public, mitigating or lessening environmental strains, and encouraging growth in their economy. *Alternative Protein Innovation Task Force: Board and Commission Details*, GOVERNOR’S OFF. OF EXEC. APPOINTMENTS, <https://govappointments.illinois.gov/boardsandcommissions/details/?id=fec71beb-163d-ee11-bdf4-001dd80974af> [<https://perma.cc/EL4L-X4Q5>].

37. Emily Stone, *Cell Cultured Meat*, S. AG TODAY (Sep. 13, 2024), <https://southernagtoday.org/2024/09/13/cell-cultured-meat/> [<https://perma.cc/JTQ7-BPL3>].

38. FLA. STAT. § 500.452 (2025); ALA. CODE § 20-1-161 (2025).

39. Food Safety Mag. Ed. Team, *Texas Becomes Seventh State to Ban Cultivated Meat*, FOOD SAFETY MAG. (June 25, 2025), <https://www.food-safety.com/articles/10473-texas-becomes-seventh-state-to-ban-cultivated-meat> [<https://perma.cc/85WV-GX4V>].

40. While there are limited instances of international supermarkets selling products containing cell-cultivated meat, other than a brief appearance of cell-cultivated chicken on the menus of U.S. restaurants, cell-cultivated meat has yet to hit American retail markets at all. Matt Reynolds, *Lab-Grown Meat Is on Shelves Now. But There’s a Catch*, WIRED (May 16, 2024, at 08:36 CT), <https://www.wired.com/story/eat-just-good-meat-singapore-cultivated-lab-grown-chicken/> [<https://perma.cc/S69S-BEZ2>] (reporting Singapore’s foray into cell-cultivated

indication of a public health exigency, has been immaterial to the progression of these laws.

In the past, livestock producers and dairy farmers attacked perceived market threats to their produce by pursuing strict labeling requirements for plant-based meat alternatives or GMO meat and dairy products. In the context of dairy, this manifested in vehement legal wrangling over the term “milk” and its application to plant-based products.⁴¹ The terms “meat” or “burger” have also been subject to labeling battles in these contexts and ultimately have been largely resolved in favor of clear labeling of plant-based products.⁴² Genetically modified animals, such as AquAdvantage salmon, are subject to premarket oversight through the FDA and additional labeling requirements.⁴³ Missouri, Iowa, Kansas, North Dakota, and South Dakota have followed this established tactic and added specific labeling requirements for cell-cultivated meat, as well as occasional additional studies of the product, or a limit of the use of state or local funds to buy cell-cultivated meat products.⁴⁴ However, no plant-based meat alternative or genetically modified whole animal has ever been subject to bans or criminalization at the state level.⁴⁵ Rather, current and pending state legislation aimed at cell-cultivated meat escalates

meat: “This is the first time that cultivated meat—no-slaughter meat with real animal cells grown in bioreactors—has been sold at retail anywhere in the world.”). That said, some products may be offered to U.S. consumers in the immediate future. *See* Jim Eadie, *Cultivated Pork Fat Wins USDA Green Light, Marking a Milestone for Alternative Protein*, SWINEWEB (July 28, 2025), <https://www.swineweb.com/latest-swine-news/cultivated-pork-fat-wins-usda-green-light-marking-a-milestone-for-alternative-protein/> [https://perma.cc/V5GE-G2LQ] (reporting plans by Mission Foods to place newly approved plant and cell-cultivated meat products on shelves at U.S.-based grocery stores).

41. *See, e.g.,* Ocheesee Creamery LLC v. Putnam, 851 F.3d 1228, 1240 (11th Cir. 2017) (concluding that the First Amendment allowed for use of the term “milk” as it was not inherently misleading).

42. *See infra* Part III.A.1.

43. *See* 7 U.S.C. § 1639b (authorizing regulations of bioengineered food).

44. Becky Leis, *Though Not Yet on Grocery Shelves, Lab-Grown Meat Is Focus of New Laws and Legislation*, CSG MIDWEST (Apr. 25, 2025), <https://csgmidwest.org/2025/04/25/though-not-yet-on-grocery-shelves-lab-grown-meat-is-focus-of-new-laws-and-legislation> [https://perma.cc/48S3-APWK]; MO. REV. STAT. § 265.494(7) (2025).

45. *See* Irene Jiang, *Burger King Is Taking the Impossible Whopper National and Says It’s Looking Into Other Plant-Based ‘Meat’ Items*, BUS. INSIDER (Aug. 1, 2019, at 10:15 CT), <https://www.businessinsider.com/burger-king-impossible-whopper-national-explores-other-plant-based-meat-2019-8> [https://perma.cc/4TK4-YCP8] (discussing nationwide distribution of the Burger King Impossible Burger).

impediments to cell-cultivated meat beyond these past tactics by criminalizing the sale, marketing, or production of cell-cultivated meat.⁴⁶

The Draconian actions of many states in response to cell-cultivated meat are legal outliers—even in the highly contentious legal web of the food system. As a general matter, the U.S. food system errs heavily on the side of post hoc remedies for consumer harm and allows consumer choice as the default (much to the chagrin of dietary and public health experts).⁴⁷ Bans on specific foods or even additives are exceedingly rare.⁴⁸ Historically, such prohibitions at the federal level must be linked to food safety concerns.⁴⁹ With cell-cultivated meat, there is no such existing food safety concern, other driving factors must be animating hostile legislation.

46. See *infra* Part III.B.

47. MARION NESTLE, *FOOD POLITICS: HOW THE FOOD INDUSTRY INFLUENCES NUTRITION AND HEALTH* 197 (2013) (discussing how the public is given broad access to nutritionally poor food choices); Lawrence O. Gostin, “*Big Food*” *Is Making America Sick*, 94 MILBANK Q. 480, 483 (2016) (arguing that, consumer choice is undermined by what he terms “big food” and how “[i]t obfuscates nutritional information to confuse consumers, targeting young people and minorities in particular.”).

48. See, e.g., *Final Determination Regarding Partially Hydrogenated Oils (Removing Trans Fat)*, FDA (Oct. 1, 2024), <https://www.fda.gov/food/food-additives-petitions/final-determination-regarding-partially-hydrogenated-oils-removing-trans-fat> [<https://perma.cc/485J-J6PT>] (banning partially hydrogenated oils after determining serious and dangerous public health impacts).

49. For example, it is illegal under federal regulations to sell unpasteurized milk over state lines due to food safety concerns. *Food Safety and Raw Milk*, FDA (Mar. 5, 2024), <https://www.fda.gov/food/buy-store-serve-safe-food/food-safety-and-raw-milk> [<https://perma.cc/N9HW-V6LP>] (discussing 1987 rulemaking prohibiting sale of raw milk over state lines). After instituting these federal pasteurization recommendations in 1924, food poisoning in the United States markedly declined. *Pasteurization*, VA. DEP’T OF HEALTH (Feb. 24, 2017), <https://www.vdh.virginia.gov/environmental-health/food-safety-in-virginia/milk-safety/pasteurization/> [<https://perma.cc/B3GY-6ZQX>] (“The number of milk-related outbreaks has dropped from nearly 25 percent of all disease outbreaks due to contaminated food and water in 1938 to less than 1 percent of reported outbreaks today. Importantly, of that 1 percent, an overwhelming majority - 70 percent - of outbreaks are linked to raw milk.” (citation omitted)); see also Leslie C. Frank, *A State-Wide Milk Sanitation Program*, 39 PUB. HEALTH REPS. 2765, 2776 (1924) (presenting a “Standard Milk Ordinance for Alabama Municipalities” which requires the pasteurization of milk). Note however, that some view this as an infringement on their identity and freedoms. Peter Smith, *Mythology and the Raw Milk Movement*, SMITHSONIAN MAG. (May 9, 2012), <https://www.smithsonianmag.com/arts-culture/mythology-and-the-raw-milk-movement-84299903/> [<https://perma.cc/4R7P-LZFF>] (explaining that some libertarians view the consumption of raw milk and the broader fight against food regulation as “a symbol of freedom”).

This Article uses the particular cultural and social importance of meat to examine the extent extra-nutritional factors contribute to food regulation. In doing so it asks: What does the battle over cell-cultivated meat tell us about our society and its values? By understanding the cultural and social meaning of food generally, and meat in particular, lawmakers can better comprehend the implications of food-related regulation and navigate them accordingly. In doing so, the Article makes three important contributions. The first is that it consolidates and provides an overview of the rapidly emerging legal state of meat and cell-cultivated meat in the United States.⁵⁰ Second, the Article explores various reasons why state opposition to cell-cultivated meat exists where federal level opposition is weak or nonexistent.⁵¹ Third, the Article uses a case study of cell-cultivated meat to demonstrate how legal conceptions of food are fused with identity and place significant weight on food's cultural and social meaning. This goes beyond issues of food safety, nutritional value, environmental concerns, or even agricultural protectionism.⁵² The conflict over cell-cultivated meat is heated because it is a culture war—not an economic one. When passing laws and regulations in the space of food, lawmakers must contextualize existing policy priorities to have them be effective and socially accepted.

II. THE LEGAL CONSTRUCTION OF MEAT

A. Linguistic & Common Law Usage and Origins

Classic textualist analysis of a term in law begins with its “plain meaning.”⁵³ So what is the plain meaning of the term “meat”? Turns out, meat in traditional English language usage is defined far broader than the way that some conventional livestock producers would like it used legally.⁵⁴ Merriam Webster Dictionary provides four definitions, the first of which is: “[food] especially : solid food as distinguished from drink . . . the edible part of something as distinguished from its covering (such as a husk or shell).”⁵⁵ As a secondary definition, it goes on to discuss meat as “animal tissue considered especially as food: flesh.”⁵⁶ Collins dictionary concurs with the second definition: “Meat is flesh taken from a dead

50. See *infra* Part III.

51. See *infra* Part III.B–C.

52. See *infra* Part IV.

53. *Textualism*, CORNELL L. SCH. LEGAL INFO. INST., <https://www.law.cornell.edu/wex/textualism> [<https://perma.cc/7Z2C-HNP6>].

54. See *Meat*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/meat> [<https://perma.cc/9ZV5-XBSY>].

55. *Id.* (definition 1).

56. *Id.* (definition 2).

animal that people cook and eat.”⁵⁷ The Oxford English Dictionary (OED) lists three principal definitions for the noun “meat” with twelve subparts total.⁵⁸ The leading definition aligns with Merriam Webster as “[s]enses relating to food generally” and then explains this could mean, “[f]ood, as nourishment for people and fodder for animals; *esp.* solid food, as opposed to *drink*[.]” “[a] kind of food; an article of food, a dish[.]” or “[a] meal, a feast.”⁵⁹ The second definition “[s]enses relating specifically to flesh” discusses the use of the term to denote flesh from an animal as opposed to that from a “fruit, nut, egg, etc., likened in texture to the flesh of animals[.]”⁶⁰ The early legal usage of the term meat paralleled a broader plain usage which included non-animal flesh as meats.⁶¹

The term “meat” can also delineate a narrower category of animal tissue, rather than flesh from all animals. For example, meat can specifically mean flesh from only land-dwelling mammals like pigs, horses, cow, sheep, and goats, as opposed to fish or birds.⁶² The OED situates these usages of the term meat geographically, noting that regions of the United States may use the term “meat” to only apply to beef or pork, while regions in south Asia would use the term meat to apply only to the flesh of mutton or goat.⁶³ This narrower usage, excluding fowl and fish, is one that was largely adopted in the regulatory structure of the administrative state in the legislation of the twentieth century.⁶⁴ As the following Subpart will demonstrate, federal statutory law differentiates between land animals, fowl, and fish—a distinction that persists to this day.

57. *Meat*, COLLINS DICTIONARY, <https://www.collinsdictionary.com/dictionary/english/meat> [<https://perma.cc/EW5E-HGVV>] (definition 1).

58. *Meat*, OXFORD ENG. DICTIONARY, https://www.oed.com/dictionary/meat_n?tab=meaning_and_use#37489768 [<https://perma.cc/QW23-4Q8D>] (definitions I–III).

59. *Id.* (definition I.1–I.3).

60. *Id.* (definition II.4.a., II.5).

61. *See Sturges v. Bridgeman*, 11 Ch. D. 852 (U.K. 1879) (discussing the internal parts of nuts in a nuisance case involving a candy shop’s use of mortars to pound “meat and other materials of confectionery”).

62. *See Meat*, MERRIAM-WEBSTER DICTIONARY, <https://www.merriam-webster.com/dictionary/meat> [<https://perma.cc/9ZV5-XBSY>] (definition 2) (further narrowing the flesh in subpart 2(b) to “flesh of a mammal as opposed to fowl or fish”); *Meat*, OXFORD ENG. DICTIONARY, https://www.oed.com/dictionary/meat_n?tab=meaning_and_use#37489768 [<https://perma.cc/QW23-4Q8D>] (definition II.4.a) (explaining the particular use of meat as referring to edible animal flesh “excluding fish and sometimes poultry, and usually in contrast to the bones and other inedible parts”).

63. *Meat*, OXFORD ENG. DICTIONARY, https://www.oed.com/dictionary/meat_n?tab=meaning_and_use#37489768 [<https://perma.cc/QW23-4Q8D>] (definition II.4.a).

64. *See infra* Part II.B.

B. Federal Statutory & Regulatory Law: All the Cooks in the Kitchen

The current food regulatory system in the United States is fairly modern.⁶⁵ It is dominated by two primary goals set by early statutes in this area. On one side, laws regarding food focus on production maximization and address stability in the farm sector (including supply and demand).⁶⁶ On the other, laws center on food safety and protecting consumers from harmful and dangerous products.⁶⁷ In the 1970s these two pillars were joined by a third congressional charge: environmental protection. These laws which sought to limit agricultural productions' negative externalities within the broader ecosystem. This concern looked beyond food safety in terms of immediate food toxicity, to the ecological impacts of the agricultural production process on various natural resources.⁶⁸ Each of these areas of laws is implemented by its own federal agency and plays a significant role in regulating the U.S. food system. In broad brush strokes, this translates into the USDA focusing on the economic viability of farms and food scarcity,⁶⁹ the FDA overseeing consumer protection and food safety,⁷⁰ and the EPA regulating potentially dangerous inputs (like pesticides, herbicides, and rodenticides) and harmful outputs (like air emissions, toxic runoff, and concentrated fecal matter in water).⁷¹

This Subpart cannot review all the nuances of how these three agencies, and others, align and collide within the U.S. food system. Rather, it will focus on the singular task of examining what the USDA, the FDA, and their enabling statutes

65. See, e.g., Agriculture Improvement Act of 2018, Pub. L. No. 115-334, 132 Stat. 4490.

66. See *id.* (regulating funding, trade, conservation, and production in U.S. agriculture).

67. See, e.g., Federal Food, Drug, and Cosmetic Act, Pub. L. No. 75-717, 52 Stat. 1040 (1938); 21 U.S.C. §§ 321–399i (regulating harmful products).

68. See, e.g., Federal Water Pollution Control Act Amendments of 1972, Pub. L. No. 92-500, 86 Stat. 816; 33 U.S.C. §§ 1251–1389.

69. What is colloquially known as “the Farm Bill,” the Agricultural Improvement Act is an omnibus piece of legislation that is subject to renewal every five years and is codified throughout Title 7 of the U.S. Code. See JIM MONKE, RANDY ALISON AUSSENBERG & MEGAN STUBBS, CONG. RSCH. SERV., R47659, EXPIRATION OF THE 2018 FARM BILL AND EXTENSION FOR 2025, at 1 (2024). It currently contains 12 chapters that span a wide berth of programs from farm financing to supplemental nutrition. *Farm Bill*, USDA, <https://www.usda.gov/farming-and-ranching/farm-bill> [<https://perma.cc/E8BA-4BUJ>].

70. See, e.g., Federal Food, Drug, and Cosmetic Act, Pub. L. No. 75-717, 52 Stat. 1040 (1938); 21 U.S.C. §§ 321–399i; FDA Food Safety Modernization Act, Pub. L. No. 111-353, 124 Stat. 3885 (2011); 21 U.S.C. §§ 111–353.

71. See 33 U.S.C. §§ 1251–1389 (providing particular use of the National Pollutant Discharge Elimination System (NPDES) permit program, codified at 33 U.S.C. § 1342, to oversee concentrated animal feed operations); 7 U.S.C. §§ 136–136y (covering insecticides and environmental pesticide control).

say regarding meat, with an eye toward setting the stage for the consideration of laws regarding cell-cultivated meat. Because the EPA's charge in this area lies primarily in water quality and, by extension, negative externalities from concentrated animal feeding operations, this Article will omit detailed discussion of the EPA, as neither its statutes nor regulations define meat as a product.⁷²

C. Taking a Stab at Regulating Food: Legislation of 1906

Meat and the slaughter of animals played a significant role in the birth of the modern food regulatory system.⁷³ Congress was galvanized into action, passing statutes that became the basis of modern food-related legislation, largely as a response to public interest in food and drug safety.⁷⁴ When Upton Sinclair published *The Jungle* in 1906, the public was horrified to learn of the squalid and unsanitary conditions in America's stockyards and slaughterhouses.⁷⁵ President Theodore Roosevelt dispatched two investigators, labor commissioner Charles Neill and social reformer James Reynolds to visit the Chicago stockyards.⁷⁶ The Neill-Reynolds Report confirmed and augmented Sinclair's findings, revealing truly vile and nauseating conditions.⁷⁷ President Roosevelt sent a summary of the Report to Congress with an impassioned letter imploring lawmakers to pass legislation on the matter in all haste: "It is imperatively necessary in the interest of health and of decency that [the Chicago stockyards] should be radically changed. Under the

72. The EPA's jurisdiction is based on the definition of a point source for water pollution purposes. See 33 U.S.C. § 1251. As it pertains to meat, this permitting system is tethered in the agricultural context to the classification of a facility as a sufficiently sized Animal Feed Operation which is based on number of whole animals. 40 C.F.R. § 122.23 (2025). As such, it is unlikely based on a facial reading of existing regulations that cell-cultivated meat facilities would ever qualify from NPDES oversight through existing regulatory structure for animal agriculture. See *id.* That said, cell-cultivated meat facilities could qualify as a point source, should they begin to discharge pollutants through "any discernible, confined, and discrete conveyance" into the waters of the United States. See *Clean Water Act Section 502: General Definitions*, EPA (Feb. 18, 2026), <https://www.epa.gov/cwa-404/clean-water-act-section-502-general-definitions> [<https://perma.cc/3NNT-3BLE>] (defining point source).

73. Christopher Klein, *How Upton Sinclair's 'The Jungle' Led to US Food Safety Reforms*, HIST. (May 27, 2025), <https://www.history.com/articles/upton-sinclair-the-jungle-us-food-safety-reforms> [<https://perma.cc/H9AG-YFWY>].

74. *Id.*

75. *Id.* ("The vivid, nauseating descriptions lent momentum to the pure food movement. . . . 100 letters a day in support of food safety legislation poured into the White House after the novel's release.").

76. *Id.*

77. See H.R. DOC. NO. 59-873, at 3–10 (1906) (detailing the handling of meat with unclean hands, in dirty conditions, with unnecessarily degrading labor norms that lacked bathrooms, breaks, and were extremely cold, wet, bloody, and infested with fecal matter).

existing law it is wholly impossible to secure satisfactory results.”⁷⁸ Shortly thereafter, in response to pronounced public outcry, the Neill-Reynolds Report, and the Presidential letter, Congress passed two landmark food safety laws: the Meat Inspection Act of 1906 (officially known as the Federal Meat Inspection Act (FMIA))⁷⁹ and the Pure Food and Drugs Act of 1906.⁸⁰

These pieces of landmark legislation set the basis of our modern food system, both in codifying key terms and in creating a structural administrative apparatus.⁸¹ The FMIA defined as a matter of statutory law the term “meat food product,” what it meant to have adulterated meat, and it set labeling requirements for meat-like substances.⁸² The Act defined these foods in relation to whole live animals, stating that “the term ‘meat food product’ means any product capable of use as human food which is made wholly or in part from any meat or other portion of the carcass of any cattle, sheep, swine, or goats[.]”⁸³ The Act further clarified that meat products must come from slaughtered animals, as meat or meat food products will be considered “adulterated” “if it is, in whole or in part, the product of an animal which has died otherwise than by slaughter[.]”⁸⁴ This statute also identified expectations regarding products that mimic meat, noting in the labeling requirements that an item will be legally viewed as misbranded “if it is an imitation of another food, unless its label bears, in type of uniform size and prominence, the word ‘imitation’ and immediately thereafter, the name of the food imitated[.]”⁸⁵

D. Modern Regulatory Apparatus

These statutory origins of the modern food regulatory system separated the treatment of meat from other foodstuffs in terms of oversight and set the stage for the current mix of federal agencies involved in food-related legal and policy work. The Meat Inspection Act placed power exclusively in the Secretary of Agriculture,⁸⁶ whereas the Pure Food and Drugs Act listed enforcement powers for

78. *Id.* at 1.

79. 21 U.S.C. §§ 601–625 (requiring more stringent inspections and requirements for meat packing and slaughtering).

80. *Id.* §§ 1–15 (later repealed or transferred; known colloquially as the Food Safety Act, prohibiting the sale of misbranded or adulterated food and drugs in interstate commerce).

81. *Id.* § 601.

82. *Id.* § 601(j), (m); 21 C.F.R. § 101.3 (2025).

83. 21 U.S.C. § 601(j).

84. *Id.* § 601(m)(5).

85. *Id.* § 601(n)(3).

86. *See id.* § 601(a) (“The term ‘Secretary’ means the Secretary of Agriculture of the United States or his delegate.”).

any of three secretaries: treasury, agriculture, and commerce.⁸⁷ As such, it set a precedent in statutory law and administrative practice to differentiate meat (a narrowly defined term) from other food products. Subsequent laws followed suit, continuing to entrust the bulk of meat and meat foods oversight to the USDA.⁸⁸ It is in regulations promulgated pursuant to the statutory mandate of the FMIA that these definitions were further clarified by the USDA's Food Safety Inspection Service (FSIS).⁸⁹ Specifically, these regulations define meat as:

The part of the muscle of any cattle, sheep, swine, or goats which is skeletal or which is found in the tongue, diaphragm, heart, or esophagus, with or without the accompanying and overlying fat, and the portions of bone (in bone-in product such as T-bone or porterhouse steak), skin, sinew, nerve, and blood vessels which normally accompany the muscle tissue and that are not separated from it in the process of dressing. As applied to products of equines, this term has a comparable meaning.⁹⁰

Although the Food, Drug and Cosmetic Act of 1938 (FDCA), created the modern Food and Drug Administration by vesting the agency with considerable general power to oversee food and drug products in the United States,⁹¹ it contained an explicit exemption to the general jurisdiction of the FDA to oversee the food safety of the U.S. food system for meat.⁹² Shortly after the passing of the FDCA, the FDA (previously known as the Food, Drug, and Insecticide Administration) was transferred from being housed in the USDA to the newly created Federal Securities Administration (which was renamed multiple times and is now the Department of Health and Human Services).⁹³ This reorganization further fragmented the administration of the U.S. food system.

Subsequently, in 2011, Congress passed the Food Safety Modernization Act (FSMA), which significantly revised the FDCA to focus on preventing food-based

87. 21 U.S.C. § 3 (repealed 1938).

88. Similarly, when the Poultry Products Inspection Act was passed in 1957 and substantially revised in 1968, Congress allocated enforcement and oversight of the act to USDA, aligning with the Meat Inspection Act. 21 U.S.C. §§ 451–473.

89. 9 C.F.R. § 301.2 (2025).

90. *Id.* (“Meat does not include the muscle found in the lips, snout, or ears. Meat may not include significant portions of bone, including hard bone and related components, such as bone marrow, or any amount of brain, trigeminal ganglia, spinal cord, or dorsal root ganglia (DRG).”)

91. *See* 21 U.S.C. § 393.

92. *Id.* § 392(a).

93. *Location of FDA and Its Predecessors in Federal Government*, FDA (Jan. 31, 2018), <https://www.fda.gov/about-fda/changes-science-law-and-regulatory-authorities/location-fda-and-its-predecessors-federal-government> [<https://perma.cc/G85R-LDGY>].

illness from occurring, rather than being responsive to crises after they have occurred, but retained exemptions allowing the USDA to retain oversight in the conventional meat space.⁹⁴ Through these Acts however, the FDA plays a regulatory role in overseeing meat and meat products in the residual legal spaces where the USDA does not have authority through the Meat Inspection Act, the Poultry Products Act, and their progeny.⁹⁵ These animal products include all seafood and seafood products; game and game meats (known as “non-amendable meats”); certain broths, oils, or sandwiches; and meat used for nonhuman consumption.⁹⁶ Because of the FDA’s responsibility in enforcing the FDCA, the Public Health Service Act, and the Fair Packaging and Labeling Act, the FDA must generally ensure that food is correctly labeled and unadulterated.⁹⁷ To do so, it inspects manufacturing or packing facilities and vehicles transporting food domestically.⁹⁸

In summary, in the United States today, conventional meat is regulated by a combination of entities, most directly the USDA, the FDA, and to a lesser extent the EPA which interacts directly with livestock in relation to concentrated feed operations (CAFO). The USDA regulates domestic agriculturally raised meat,

94. FDA Food Safety Modernization Act, Pub. L. No. 111-353, 124 Stat. 3885 (2011). Shifting from reactive to proactive regulation meant that the FDA was permitted to be involved in premarket elements of food production. *See id.*; *Food Safety Modernization Act (FSMA)*, FDA (Feb. 5, 2024), <https://www.fda.gov/food/guidance-regulation-food-and-dietary-supplements/food-safety-modernization-act-fsma> [<https://perma.cc/8U8K-64Z2>].

95. *Compare* FDA Food Safety Modernization Act, Pub. L. No. 111-353, 124 Stat. 3885 (2011) (creating an exception that the FDCA does not alter or limit the authority under the Federal Meat Inspection Act or the Poultry Products Inspection Act), *with FDA Regulated Meats and Meat Products for Human Consumption*, FDA (Oct. 4, 2023), <https://www.fda.gov/food/meat-guidance-documents-regulatory-information/fda-regulated-meats-and-meat-products-human-consumption> [<https://perma.cc/CXU2-DD6N>] (designating authority to the USDA to regulate “amenable species” under the Federal Meat Inspection Act and the Poultry Products Inspection Act).

96. *FDA Regulated Meats and Meat Products for Human Consumption*, *supra* note 95 (noting FDA oversight responsibility for non-amendable meats which includes antelope, bison, deer, elk, reindeer, muskrat, non-aquatic reptiles, opossum, rabbit, raccoon, squirrel, water buffalo, grouse, pheasant, quail, wild turkey, wild geese, and wild ducks); 21 C.F.R. § 123 (2025) (setting forth regulations regarding fish and fishery products); *id.* § 113 (regulating pet foods).

97. *Formal Agreement Between FDA and USDA Regarding Oversight of Human Food Produced Using Animal Cell Technology Derived from Cell Lines of USDA-Amenable Species*, FDA (Mar. 7, 2019) [hereinafter *Formal Agreement*], <https://www.fda.gov/food/human-food-made-cultured-animal-cells/formal-agreement-between-fda-and-usda-regarding-oversight-human-food-produced-using-animal-cell> [<https://perma.cc/3295-ESJE>].

98. *See id.*

poultry, and eggs for human consumption, pursuant to the Federal Meat Inspection Act, the Poultry Products Inspection Act, and the Egg Products Inspection Act.⁹⁹ The USDA-FSIS is the USDA's food inspection arm, and businesses regulated by the USDA must have a USDA on-site inspector at all times.¹⁰⁰ The FSIS inspects slaughter facilities and processing plants and oversees the import of amenable meat, poultry, and eggs.¹⁰¹ For most food, the FDA oversees labeling of products to ensure they are not false or misleading.¹⁰² All other products are overseen by the FDA, including unusual or game meats—food products being fed to animals and nonhumans, other living organisms, and seafood or fish products.¹⁰³ Where a food product lacks a name established by federal law or regulation or a common name, food labels must accurately describe the food or use a “fanciful name” commonly used by the public.¹⁰⁴

III. MEATING THE FUTURE: LAW & ALTERNATIVES TO CONVENTIONAL MEAT

A. Alternatives to Conventional Meat: Plants & GMO Animals

There have been significant developments in recent years in the creation of new meat and meat-like food substances. Today, there are three primary types of products that potentially compete with conventional meats: plant-based meat alternatives, meat from genetically modified organisms (GMOs), and cell-cultivated meat.¹⁰⁵ A plant-based meat alternative is made from substances derived from plants or fungi.¹⁰⁶ Historically, these were made using traditional food

99. *Id.*

100. 7 C.F.R. § 205.403(a) (2025).

101. *Formal Agreement*, *supra* note 97.

102. See 21 C.F.R. § 101.3 (2025); Steph Tai, *Legalizing the Meaning of Meat*, 51 LOY. U. CHI. L.J. 743, 774–75 (2020).

103. See 21 C.F.R. § 123 (2025) (Fish and fishery products); *What Does FDA Regulate?*, FDA (Mar. 29, 2024), <https://www.fda.gov/about-fda/what-we-do/what-does-fda-regulate> [<https://perma.cc/2F26-JWMH>].

104. 21 C.F.R. § 101.3(b)(3) (2025).

105. See Tai, *supra* note 102, at 763–71 (discussing plant-based meat analogs and cell-cultured meats); Marco Bellini, *Understanding Bioengineered Foods: What They Are and Their Impact*, J. FOOD TECH. & PRES., 2024, at 1, 1 (discussing GMO meat).

106. *Cell-Cultured Meat Updates: State Bans, Labeling Requirements, and Regulatory Clarifications*, NAT'L AGRIC. L. CTR. (June 6, 2024), <https://nationalaglawcenter.org/cell-cultured-meat-updates-state-bans-labeling-requirements-and-regulatory-clarifications/> [<https://perma.cc/88ZP-E29Q>] (“Meat alternative is a term typically used to describe a food product that is not derived from harvested livestock but manufactured to mimic a food product that is. For example, a vegan burger that is created to look and taste like a traditional burger derived from beef but is actually made from chickpeas.”).

preparation processes (like lentil patties or tofu), but increasingly they are the subject of intense biotechnological research that is creating new plant-derived proteins.¹⁰⁷ Plant-based meat alternatives are now found in virtually every supermarket in the United States and in many restaurants and fast food chains.¹⁰⁸

Biotechnology has not only created plant-based products that better mimic the sensation of eating meat, but has also used genetic modification to create living animals that they think will better suit human consumption needs.¹⁰⁹ Eating meat from genetically modified animals is a bit of a misnomer, since genetic modification of plants and animals can be traced back for centuries to traditional agricultural practices such as plant grafting and selective breeding in animal husbandry.¹¹⁰ However, in modernity, when speaking of genetically modified farm animals, companies, lawmakers, and activists are referring to lab-based genetic modification, which allows scientists to strategically add, modify, or remove specific DNA sequences in a breed instantaneously to enhance perceived strengths, eliminate weak characteristics, or introduce new traits altogether.¹¹¹ However, a genetically modified animal is still a whole living organism and is not cultivated in a lab environment.¹¹² It eats, breathes, moves, and sleeps. The genetically

107. Rubio, Xiang & Kaplan, *supra* note 7, at 2.

108. Caroline Roberts, *9 Plant-Based Meats You Can Buy at the Grocery Store*, CNET (Dec. 12, 2019, at 06:00 PT), <https://www.cnet.com/health/nutrition/these-are-the-plant-based-meats-you-can-buy-at-the-grocery-store/> [<https://perma.cc/JYP5-XFFA>] (listing various plant-based meat alternatives widely available at supermarkets in the United States).

109. *See* Rubio, Xiang & Kaplan, *supra* note 7, at 2 (describing how plant-based products are processed to simulate meat); Bellini, *supra* note 105, at 1 (“Bioengineering allows scientists to introduce specific genes into a plant or animal, resulting in characteristics like pest resistance, enhanced nutrition, or increased shelf life.”).

110. R. A. LAWRIE & D. A. LEDWARD, *LAWRIE’S MEAT SCIENCE* 2 (7th ed. 2006), https://ubblab.weebly.com/uploads/4/7/4/6/47469791/lawries_meat_science.pdf [<https://perma.cc/A5SB-DTZJ>] (observing that modern meat is a product of “selected breeding organized by man, planned development of breeds having certain desired properties and extermination of wild ancestors”).

111. *See* Bellini, *supra* note 105, at 1; *see also Q&A for Consumers on Intentional Genomic Alterations in Animals*, FDA (Feb. 27, 2025), <https://www.fda.gov/animal-veterinary/intentional-genomic-alterations-igas-animals/qa-consumers-intentional-genomic-alterations-animals> [<https://perma.cc/Y8HD-Y367>] (discussing purposes of genomic alterations in animals).

112. *See Q&A on FDA’s Approval of AquAdvantage Salmon*, FDA (Feb. 27, 2025), <https://www.fda.gov/animal-veterinary/aquadvantage-salmon/qa-fdas-approval-aquadvantage-salmon> [<https://perma.cc/C23A-Q2UK>].

modified animal is born, and then it dies. Meat from such animals, specifically genetically modified salmon and pigs, has been approved for the U.S. market.¹¹³

Finally, the third food product in the traditional meat space is the primary subject of this Article, cell-cultivated meat. Here, the process of cell-cultivated meat begins with taking a tissue sample from a live animal.¹¹⁴ This animal does not need to be slaughtered or significantly injured in the extraction process.¹¹⁵ After cell extraction, the sample is placed in an organic growth solution also known as a “culture medium” and placed into a bioreactor, a form of controlled incubator.¹¹⁶ To mimic lifelike meat, cell-cultivated meat is grown on some kind of bio-scaffolding to obtain structural strength and the desired texture.¹¹⁷ This type of scaffolding occurs naturally in an animal’s body as animal bodies are made up of more than meat (muscles), but also tendons, arteries, veins, ligaments, cartilage, and bone.¹¹⁸ The difference between plant-based meat alternatives and cell-cultivated meat lies in the root organism used to produce the foodstuff.¹¹⁹ Where cell-cultivated meats are made from duplicated animal cells, plant-based meat alternatives are sourced from fungi, tree nuts, legumes, seeds, grains, starches, fruits, or vegetables.¹²⁰

This Subpart briefly explains existing regulatory responses and legal challenges to the first two categories, plant-based meat alternatives and genetically modified farm animals but reserves a fulsome discussion of cell-cultivated meat for Part IV. This Subpart focuses instead on providing context for understanding cell-cultivated meat, in the legal world of conventional meat alternatives.

113. *GMO Crops, Animal Food, and Beyond*, FDA (Mar. 5, 2024), <https://www.fda.gov/food/agricultural-biotechnology/gmo-crops-animal-food-and-beyond> [<https://perma.cc/ZGR8-9RG2>].

114. Nicola Jones, *Lab-Grown Meat: The Science of Turning Cells into Steaks and Nuggets*, NATURE (July 4, 2023), <https://www.nature.com/articles/d41586-023-02095-6> [<https://perma.cc/33UK-VTJC>].

115. Sina Soleymani, Seyed Morteza Naghib & M.R. Mozafari, *An Overview of Cultured Meat and Stem Cell Bioprinting: How to Make It, Challenges and Prospects, Environmental Effects, Society’s Culture and the Influence of Religions*, J. AGRIC. & FOOD RSCH., 2024, at 1, 14.

116. *Id.* at 1, 7.

117. *Id.* at 7.

118. Michael H. Jaffe, *Overview of the Musculoskeletal System in Animals*, MSD VETERINARY MANUAL (Oct. 2025), <https://www.msdsvetmanual.com/musculoskeletal-system/musculoskeletal-system-introduction/overview-of-the-musculoskeletal-system-in-animals> [<https://perma.cc/X2LQ-VMJ4>].

119. *See* Rubio, Xiang & Kaplan, *supra* note 7, at 2.

120. *See id.*

1. *Plant-Based Meat—Impossible!*

In the last 15 years, plant-based meat has gone from fringe to mainstream.¹²¹ No longer confined to hippie enclaves and health food stores, companies from Starbucks to Burger King and even Tyson are jumping on the bandwagon of offering meat alternatives.¹²² Some of this is attributable to the taste profile of product itself changing—no longer a mealy lentil patty or a soggy mushroom base, agrotechnology around meat alternatives has led to the “impossible” revolution.¹²³ Subbing in plant-based “heme” for hemoglobin, plant-based meat alternatives are increasingly effective at mimicking the mouthfeel of meat from animals.¹²⁴ There are also considerably more choices in plant-based meat alternatives than there once were with products mimicking various types of animal products as well as their form or cuts.¹²⁵ The proliferation of these products to the mainstream market has led to a spate of state laws regarding the labeling of plant-based meat alternatives—

121. Jody Kirchner, Daniel Gertner & Emma Ignaszewski, U.S. Retail Market Insights for the Plant-Based Industry, GOOD FOOD INST., <https://www.gfi.org/marketresearch> [<https://perma.cc/J2Q6-5ZBG>].

122. GOOD FOOD INST., 2023 STATE OF THE INDUSTRY REPORT: PLANT-BASED: MEAT, SEAFOOD, EGGS, AND DAIRY 8 (2023), https://gfi.org/wp-content/uploads/2024/04/2023_State-of-the-Industry-Report-Plant-based-meat-seafood-eggs-and-dairy.pdf [<https://perma.cc/HMS4-4JKC>] (discussing retail and food service trends and noting the plant-based products being presented by a host of companies including Tyson, Kraft, Nestle, Starbucks, Taco Bell, and Burger King).

123. See *We Compared the Vegan Impossible Burger with a Beef Burger. This Is What We Found*, MEN’S HEALTH (Jan. 10, 2020), <https://www.menshealth.com/uk/nutrition/a30428984/impossible-burger-review/> [<https://perma.cc/AT6G-Q378>] (reporting on Burger King’s Impossible plant-based burger and calling the “scientific marvel” “bloody delicious”).

124. Julie Wolf, *The Microbial Reasons Why the Impossible Burger Tastes So Good*, AM. SOC’Y FOR MICROBIOLOGY (May 16, 2019), <https://asm.org/articles/2019/may/the-microbial-reasons-why-the-impossible-burger-ta> [<https://perma.cc/EWW5-ZRBR>] (“[M]eat-specific aromas rely on heme interactions with cellular proteins and biomolecules as it cooks. Heme catalyzes very specific types of chemical reactions . . . that transform abundant, simple nutrients into this explosion of hundreds of diverse volatile odorant molecules. When you experience them, together they add up unmistakably to the smell and taste of meat.” (internal quotation marks omitted)).

125. HUM. FOODS PROGRAM, FOOD & DRUG ADMIN, LABELING OF PLANT-BASED ALTERNATIVES TO ANIMAL-DERIVED FOODS: DRAFT GUIDANCE FOR INDUSTRY 5 (2025), <https://www.fda.gov/media/184810/download> [<https://perma.cc/W2T3-8BMP>] (“The types and varieties of plant-based alternative foods have expanded, and now consumers have product options that are intended to resemble the flavor, form or cut (e.g., burger or fillet), texture, and appearance of foods derived from animals.”).

beef producers in particular have balked at the competition.¹²⁶ Some of these laws prohibited the use of the term meat or any historically meat-identifiable term at all (such as “sausage” or “burger”).¹²⁷ Other states focus on requiring plant-based alternatives clarify that they are not conventional meat by using a qualifier such as “veggie,” “plant-based,” “meatless,” or “vegetarian” when referring to such products.¹²⁸

Biotechnology firms have challenged these state labeling laws as invalid by raising a host of legal arguments, some constitutional in nature, others economic or policy driven.¹²⁹ Constitutionally, these lawsuits allege violations of the

126. Alina Selyukh, *What Gets to Be a ‘Burger’? States Restrict Labels on Plant-Based Meat*, NPR (July 23, 2019, at 15:57 ET), <https://www.npr.org/sections/thesalt/2019/07/23/744083270/what-gets-to-be-a-burger-states-restrict-labels-on-plant-based-meat> [<https://perma.cc/Y6NB-SU6S>] (“You can’t take a Buick, take the hood ornament off and slap a Porsche hood ornament on, and try to sell that Buick as a Porsche. It doesn’t work like that.”).

127. See, e.g., *id.*; LA. STAT. ANN. § 3:4744(B)(9) (2025) (stating that intentionally misbranding or misrepresenting includes “[u]tilizing a term that is the same as or deceptively similar to a term that has been used or defined historically in reference to a specific agricultural product”); ARK. CODE ANN. § 2-1-305 (2019) (banning the use of terms like “burger” or “sausage” on vegetarian products by prohibiting the sale of an “agricultural product under the name of another food” or representing food as “meat” unless it was derived from “harvested livestock”), *invalidated in part by*, *Turtle Island Foods SPC v. Soman*, 632 F. Supp. 3d 909 (E.D. Ark. 2022). For a state-by-state discussion of meat labeling laws, see Tai, *supra* note 102, at 752–55.

128. See, e.g., GA. CODE ANN. § 26-2-152(c)(1)(B)(2) (2025) (requiring that plant-based products prominently display on their packaging “‘vegetarian,’ ‘veggie,’ ‘vegan,’ ‘plant based,’ or other similar term indicating that the product is plant based and does not include the flesh, offal, or other by-product of any part of the carcass of a live animal that has been slaughtered”); WYO. STAT. ANN. § 35-7-119(e)(ii) (2025) (requiring plant-based meat alternatives “clearly label plant based products as ‘vegetarian,’ ‘veggie,’ ‘vegan,’ ‘plant based’ or other similar term indicating that the product is plant based”). After a more restrictive labeling law was struck down by the courts on First Amendment grounds, the Mississippi Administrative Code now provides, “A plant-based food product shall not be labeled as a ‘meat’ or ‘meat food product’ . . . [f]or purposes of this section, a plant-based food product will not be considered to be labeled as a ‘meat’ or ‘meat food product’ if one or more of the following terms, or a comparable qualifier, is prominently displayed on the front of the package: ‘meat free,’ ‘meatless,’ ‘plant-based,’ ‘veggie-based,’ ‘made from plants,’ ‘vegetarian,’ or ‘vegan.’” 2 MISS. ADMIN. CODE pt. 1, subpt. 4, r. 07.01 (2025).

129. *Turtle Island Foods Inc. v. Abbott*, No. 1:23-CV-1032-DII, 2024 WL 5659990, at *2 (W.D. Tex. Sep. 23, 2024) (challenging the constitutionality of Texas’s meat labeling law by Tofurky, a plant based-alternative meat company); see also *Turtle Island Foods, S.P.C. v. Strain*, 65 F.4th 211, 215 (5th Cir. 2023) (listing Tofurky’s complaints); Motion for Preliminary

Dormant Commerce Clause, the Free Speech Clause of the First Amendment, and the Due Process Clause of the Fourteenth Amendment.¹³⁰ These lawsuits have had mixed success.¹³¹ Economically, meat-alternative companies assert additional labeling burdens are anticompetitive and impermissibly disrupt free-market systems.¹³² These companies also push back on the alleged factual justifications for additional requirements.¹³³ Biotechnology companies note that the harm to consumers is hypothetical, as evidence of any consumer confusion regarding their products is scant at best.¹³⁴

At the federal level, Congress has taken no direct legislative action in this space, leaving the question of how to label plant-based meats to the regulatory sphere.¹³⁵ Existing labeling laws placing plant-based meats in the FDA's purview under the Federal Meat Inspection Act (FMIA), regulating beef and pigs, and the Poultry Products Inspection Act (PPIA), are facially inapplicable.¹³⁶ Thus far, the FDA has been ambivalent at best about wading into the fray of the labeling wars around the plant-based products. The FDA has issued no specific binding regulations for these products; therefore, plant-based meat alternatives do not have a standard of identity and are governed within the residual category of

Injunction, *Turtle Island Foods, SPC v. Richardson*, 425 F. Supp. 3d 1131 (W.D. Mo. 2019) (No. 2:18-CV-04173); Complaint for Declaratory and Injunctive Relief, *Upton's Nats. Co. v. Bryant*, No. 3:19-cv-462-HTW-LRA (S.D. Miss. July 1, 2019).

130. *See, e.g., Soman*, 632 F. Supp. 3d at 934 (arguing that prohibiting Tofurky from using terms like "burger" or "sausage" violates the First Amendment since the package contains other statements that eliminate consumer confusion such as "labels and marketing materials prominently identify its products variously as 'all vegan,' 'plant based,' 'vegetarian,' 'veggie,' and 'made with pasture raised plants'").

131. *See id.* at 948 (finding Arkansas's labeling law unconstitutional since the plant-based meat alternative clearly labeled their products as "plant based," thereby dispelling consumer confusion and the state failed to provide evidence of actual customer confusion); *Strain*, 65 F.4th at 221 (finding that Louisiana's law did not violate the First Amendment because it only applied when a product intentionally sought to mislead and that such statements fell outside of First Amendment protections).

132. *Abbott*, 2024 WL 5659990, at *12 (discussing Commerce Clause and Dormant Commerce Clause impacts).

133. *See id.* (asserting there is no evidence of consumer complaints or concerns about labeling of plant-based meat products).

134. *See Turtle Island Foods, SPC v. Thompson*, 992 F.3d 694, 701–02 (8th Cir. 2021) (discussing how terms like vegan are not misleading to consumers).

135. *See LABELING OF PLANT-BASED ALTERNATIVES TO ANIMAL-DERIVED FOODS: DRAFT GUIDANCE FOR INDUSTRY*, *supra* note 125, at 3.

136. *See* 21 U.S.C. § 601 (defining meat food product, of which plant-based meats do not fall under); *id.* § 451 (defining poultry product, of which plant-based meats do not fall under).

“nonstandardized foods.”¹³⁷ Nonstandardized foods are subject only to general requirements regarding the use of a common name.¹³⁸ In 2023, the FDA issued nonbinding guidance regarding plant-based milks.¹³⁹ This guidance provides insight into the core concerns underlying labeling regulations, which suggests that the FDA is focused on remedying customer confusion.¹⁴⁰ With milk, consumers are aware that plant-based milks are not “milk” in the traditional sense of being harvested from a mammal.¹⁴¹ Their perceptions, however, have been inaccurate about the nutritional content of the plant-based milks.¹⁴² Therefore, the FDA’s guidance recommended voluntary additional statements on the nutritional content of plant-based milks, but does not require eliminating the use of the term “milk.”¹⁴³

The FDA has yet to finalize industry guidance regarding plant-based meat alternatives. However, the FDA did issue a draft document: *Labeling of Plant-Based Alternatives to Animal-Derived Foods*, in January of 2025.¹⁴⁴ Public comment closed in May of 2025, and final guidance has not yet been promulgated.¹⁴⁵ This draft guidance tracks the consumer-facing concerns articulated in the milk context, noting that the goal is to provide “best practices for plant-based alternative food labels that are clear and accurate, to help enable consumers to quickly ascertain the attributes of products they are purchasing.”¹⁴⁶ In doing so, the FDA states: “We are committed to accomplishing this by empowering consumers with more informative labeling to make informed dietary

137. *Id.* § 341 (vesting authority with the FDA to establish definitions and standards of identity for foods).

138. *Id.* § 343(i).

139. Labeling of Plant-Based Milk Alternatives and Voluntary Nutrient Statements; Draft Guidance for Industry; Availability; Agency Information Collection Activities; Proposed Collection; Comment Request, 88 Fed. Reg. 11449 (Feb. 23, 2023).

140. *See id.* at 11449–50.

141. CTR. FOR FOOD SAFETY & APPLIED NUTRITION, FOOD & DRUG ADMIN, LABELING OF PLANT-BASED MILK ALTERNATIVES AND VOLUNTARY NUTRIENT STATEMENTS: GUIDANCE FOR INDUSTRY 5 (2023), <https://www.fda.gov/media/165420/download?attachment> [<https://perma.cc/MA8C-G2S2>].

142. *Id.* at 6.

143. *See id.* at 15 (“FDA recommends that plant-based milk alternatives that use the term ‘milk’ in their name . . . bear an additional nutrient statement on the product label describing how it is nutritionally different. The use of these statements is voluntary.”).

144. Labeling of Plant-Based Alternatives to Animal-Derived Foods: Draft Guidance for Industry; Availability; Agency Information Collection Activities; Proposed Collection; Comment Request, 90 Fed. Reg. 1139, 1139 (Jan. 7, 2025).

145. *Id.*

146. LABELING OF PLANT-BASED ALTERNATIVES TO ANIMAL-DERIVED FOODS: DRAFT GUIDANCE FOR INDUSTRY, *supra* note 125, at 4.

choices.”¹⁴⁷ The FDA is keenly aware of the First Amendment concerns raised against regulation in this space and crafted its guidance to focus on what is unprotected: false or misleading speech.¹⁴⁸ As such, the FDA draft guidance does not forbid the use of terms like milk or meat, but recommends the use of descriptive qualifiers for these products.¹⁴⁹

The federal proposed guidance takes care to state that it is nonbinding and “not for implementation,” rendering it nearly useless in terms of legal assurances or rights.¹⁵⁰ This is part of why food producers, both meat-alternative producers and conventional livestock ranchers, have turned to state laws to seek either more permissive use of traditional terms or harsher delineation of plant-based meats to conventional animal products.¹⁵¹

2. Genetically Modified Animals

While agriculture has long modified genetic traits in animals deliberately through breeding practice, the term “GMO” denotes an organism genetically modified through bioengineering.¹⁵² In 2016, Congress defined “bioengineered food” as food: “(A) that contains genetic material that has been modified through in vitro recombinant deoxyribonucleic acid (DNA) techniques; and (B) for which the modification could not otherwise be obtained through conventional breeding or found in nature.”¹⁵³ Early GMOs were plants that the USDA Animal and Plant Health Inspection Service (APHIS) regulated as part of their power under the Plant Protection Act (PPA). Pursuant to that authority, APHIS promulgated regulations regarding the introduction of GMOs that could pose a risk to plants.¹⁵⁴

147. *Id.*

148. *Id.* at 4 n.6.

149. *Id.* at 8.

150. *See id.* at 4 (“FDA’s guidance documents, including this guidance, do not establish legally enforceable responsibilities. Instead, guidances [sic] describe our current thinking on a topic and should be viewed only as recommendations . . .”).

151. LABELING OF PLANT-BASED MILK ALTERNATIVES AND VOLUNTARY NUTRIENT STATEMENTS: GUIDANCE FOR INDUSTRY, *supra* note 141, at 8–9 nn. 21–22 (citing federal cases over state regulation of GMO labelling).

152. Julie Babinard, *A Short History of Agricultural Biotechnology*, in GENETICALLY MODIFIED ORGANISMS IN AGRICULTURE 271, 271, 274 (Gerald C. Nelson ed., 2001); Bellini, *supra* note 105, at 1.

153. 7 U.S.C. § 1639.

154. 7 C.F.R. § 340 (2025).

The FDA retains responsibility for determining the food safety of genetically modified foods.¹⁵⁵ For plants, the FDA runs a voluntary premarket program called the “Plant Biotechnology Consultation Program” that gives companies the opportunity to seek FDA approval for new products.¹⁵⁶ However, they are not required to go through this program.¹⁵⁷ In relation to GMO animals, the FDA has approved two species for cultivation and sale in the United States: the AquAdvantage salmon, which grows at an accelerated rate, and the GalSafe pig, which eliminates a sugar that causes allergic reactions in some parties.¹⁵⁸ In doing so, the FDA concluded that “food from the AquAdvantage Salmon and the GalSafe pig are as safe and nutritious to eat as food from non-GMO salmon and pigs.”¹⁵⁹

While the FDA’s oversight of AquAdvantage salmon was relatively straightforward, it was the approval of a pig, which would normally fall into the amenable animal category of food governed by the USDA, that led to considerable interagency tension over whether the USDA or the FDA should oversee the genetically modified animal approval process.¹⁶⁰ This pig was developed using a technique of genetic modification known as “intentional genomic alterations” (IGAs).¹⁶¹ The FDA describes IGA animals as “made using modern molecular technologies, which may include random or targeted DNA sequence changes, including nucleotide insertions, substitutions, or deletions, or other technologies that introduce specific changes to the genome of the animal.”¹⁶² As of May 2024, IGA animal oversight lies with the FDA, likely in part because many uses of IGA at this time lie in the drug or pharmaceutical space.¹⁶³

155. *How GMOs Are Regulated in the United States*, FDA (Mar. 5, 2024), <https://www.fda.gov/food/agricultural-biotechnology/how-gmos-are-regulated-united-states> [https://perma.cc/N6ZC-K2MN].

156. *Programs on Food from New Plant Varieties*, FDA (Dec. 16, 2024), <https://www.fda.gov/food/food-new-plant-varieties/programs-food-new-plant-varieties> [https://perma.cc/96F8-MV2N].

157. *Id.*

158. *GMO Crops, Animal Food, and Beyond*, *supra* note 113.

159. *Id.*

160. *See Formal Agreement*, *supra* note 97; *Groups Urge Regulation of Genetically Engineered Animals Stay with FDA Not USDA*, CTR. FOR FOOD SAFETY (Apr. 7, 2021), <https://www.centerforfoodsafety.org/press-releases/6330/groups-urge-regulation-of-genetically-engineered-animals-stay-with-fda-not-usda> [https://perma.cc/Q4Q2-P58V].

161. *Q&A for Consumers on Intentional Genomic Alterations in Animals*, *supra* note 111.

162. News Release, FDA, FDA Clarifies Approach to Genomic Alterations in Animals (May 1, 2024), <https://www.fda.gov/news-events/press-announcements/fda-clarifies-approach-genomic-alterations-animals> [https://perma.cc/F3LT-64K2].

163. *See id.*

Congress has taken very little legislative action in the area of genetically modified plants or animals. Modern statutory law does not make clear where GMO regulatory power should lie, so the EPA, the FDA, and the USDA rely on intra-agency agreements and presidential executive orders to work in this space.¹⁶⁴ It is also important to note that no federal statute bans any genetically modified plant or animal. The lone exception to congressional inaction in relation to GMOs concerns labeling.¹⁶⁵ When states began passing their own individual GMO labeling requirements, Congress enacted the National Bioengineered Food Disclosure Law (NBFDL) preempting state laws and setting a nationwide standard.¹⁶⁶ The NBFDL requires food manufacturers to disclose the presence of bioengineered foods and ingredients.¹⁶⁷ Interestingly, the Act was written as an amendment to the Agricultural Marketing Act of 1946¹⁶⁸ and as such placed the GMO labeling requirement with the Secretary of Agriculture who promulgated binding regulations, titled the National Bioengineered Food Disclosure Standard (NBFDS), through the USDA Agricultural Marketing Service.¹⁶⁹

To date, no states have banned genetically modified crops or animals, although certain grassroots movements have prompted specific municipalities in Maine, Washington, Colorado, Oregon, and California to ban the cultivation of genetically modified crops in their environs (no mention of animals).¹⁷⁰ Each of these jurisdictions still allows the importation of products containing GMOs into those areas.¹⁷¹ In these grassroot campaigns, activists cite concerns over taint, essentially arguing that potential cross-pollination and contamination of non-GMO and organic plants would undermine the economic well-being of their local

164. See *How the Federal Government Regulates Biotech Plants*, USDA, <https://www.usda.gov/farming-and-ranching/plants-and-crops/biotechnology/regulation-biotech-plants> [<https://perma.cc/AW69-FZWT>]; see also *Executive Order on Modernizing the Regulatory Framework for Agricultural Biotechnology Products*, TRUMP WHITE HOUSE (June 11, 2019), <https://trumpwhitehouse.archives.gov/presidential-actions/executive-order-modernizing-regulatory-framework-agricultural-biotechnology-products/> [<https://perma.cc/R2XG-S46J>].

165. See Peggy Kirk Hall, *Congress Finalizes Mandatory GMO Labeling Law*, NAT'L AGRIC. L. CTR. (July 15, 2016), <https://nationalaglawcenter.org/congress-finalizes-mandatory-gmo-labeling-law-2/> [<https://perma.cc/MW8K-4TFM>].

166. See *id.*; *BE Disclosure*, USDA: AGRIC. MKTG. SERV., <https://www.ams.usda.gov/rules-regulations/be> [<https://perma.cc/5R2S-HTCG>].

167. 7 U.S.C. § 1639b(b–d); *BE Disclosure*, *supra* note 166.

168. 7 U.S.C. § 1621; Hall, *supra* note 165.

169. 7 C.F.R. § 66.1 (2025); 7 U.S.C. § 1639b(a)(1).

170. *Where Are GMO Crops and Animals Approved and Banned?*, GENETIC LITERACY PROJECT, <https://geneticliteracyproject.org/gmo-faq/where-are-gmo-crops-and-animals-approved-and-banned/> [<https://perma.cc/SEX2-L3WE>].

171. *Id.*

communities.¹⁷² In response to local actions to limit the increased use of genetically modified crops, 29 American states have now enacted their own statewide laws preemptively barring local governments and municipalities from making anti-GMO initiatives.¹⁷³

B. Federal Legal Action and Cell-Based Meat

As the previous Subparts made clear, food regulation in the U.S. legal system, particularly animal products, is a complicated web with strands running predominately between USDA and FDA jurisdictions. A plain reading of previously applicable statutes defining meat—meaning related to carcasses and living whole animals—would seem to place cell-cultivated meats outside of the purview of the USDA.¹⁷⁴ However, the cells used as the cell-based source of replication are extracted from live animals—so does this, or should this extraction, render cell-cultivated meat a meat product by extension? Similar to the discussion regarding genetically modified animals and meat from those animals, Congress has been conspicuously silent.¹⁷⁵ While congresses have proposed versions of the REAL Meat Act limiting the use of federal funding for the development of cell-cultivated meat, there have been no other calls for federal legislation pertaining to cell-cultivated meat.¹⁷⁶ Similarly, there have been no proposals to amend laws regarding labeling or to initiate any bans.¹⁷⁷

Since congressional action is unlikely to keep pace with technological innovations, the USDA and the FDA sought to set up a workable regulatory approach through voluntary agency understanding and coordination, similar to

172. See, e.g., Marygold Walsh-Dilley, *Localizing Control: Mendocino County and the Ban on GMOs*, 26 AGRIC. & HUM. VALUES 95, 104 (2009) (“[S]omething that was particularly important from the beginning was the extent to which organic food and agriculture is important to both producers and consumers of agricultural products in Mendocino County. The risk of cross-pollination is heightened for organic producers, since it could jeopardize the premium payment that producers receive for being organic.”).

173. Kristina Johnson, *29 States Pass ‘Seed-Preemption Laws’ That Block Cities and Counties from Banning GMOs*, GENETIC LITERACY PROJECT (Aug. 28, 2017), <https://geneticliteracyproject.org/2017/08/28/29-states-pass-seed-preemption-laws-block-cities-counties-banning-gmos/> [<https://perma.cc/2PY6-HDK6>].

174. See *supra* notes 89–90 and accompanying text.

175. See *supra* text accompanying note 164.

176. See REAL Meat Act of 2025, H.R. 1116, 119th Cong. § 2(a), (c) (seeking to ban the use of federal funds to support “production, advancement, or enhancement of cell-cultured meat” and defining “cell-cultured meat” as “meat that is sourced from the cells of animals and artificially produced in a laboratory”); REAL Meat Act of 2024, H.R. 8757, 118th Cong. § 2(a).

177. See BENSON & GREENE, *supra* note 12, at 14 (identifying only legislation delegating responsibility for regulating cell-based meat to joint jurisdiction by USDA and FDA).

how they handled emerging issues in the GMO space.¹⁷⁸ Thus, in March of 2019, the USDA and the FDA issued a formal agreement between them outlining the regulatory structure for “Human Food Produced Using Animal Cell Technology Derived from Cell Lines of USDA-amenable Species” (Animal Cell MOU).¹⁷⁹ Through this agreement, the USDA and the FDA jointly oversee cell-cultivated meats under a system that requires these products to go through a premarket testing program.¹⁸⁰ The Animal Cell MOU details the responsibilities of each regulatory agency as far as cell-cultivated meats are concerned, including a commitment between the agencies to work collaboratively in the field, revisit and modify the agreement moving forward, and cooperate on food safety issues.¹⁸¹ The agreement states that the FDA will implement and conduct premarket consultations evaluating safety, specifically overseeing tissue collection, cell banks and lines, and other input components.¹⁸² The FDA also ensures compliance with all facility registration regulations and “Good Manufacturing Practices.”¹⁸³ At harvest, the FDA then coordinates with the USDA’s Food Safety and Inspection Service (FSIS) which oversees processing of the cultured cells into food for human consumption by conducting on-sight inspections of facilities “where cells cultured from livestock and poultry subject to the FMIA and PPIA are harvested, processed, packaged or labeled”¹⁸⁴ Under the agreement, all labels for human food products from cell cultures from regulated livestock or poultry are preapproved by the USDA and subject to USDA enforcement actions “as necessary” to protect the accuracy of branding and maintain an unadulterated product.¹⁸⁵ The USDA has

178. See *Formal Agreement*, *supra* note 97 (binding only to USDA amenable species).

179. *Id.*

180. *Id.* (outlining how the FDA and USDA would work together to ensure that cell-cultured meat is not only safe but also properly labeled).

181. *Id.*

182. *Id.*

183. *Id.*

184. *Id.*; see also *FSIS Responsibilities in Establishments Producing Cell-Cultured Meat and Poultry Food Products*, USDA: FOOD SAFETY & INSPECTION SERV. (June 21, 2023) [hereinafter *FSIS Responsibilities*], <https://www.fsis.usda.gov/policy/fsis-directives/7800.1> [<https://perma.cc/CU7F-SE7X>] (“This directive refers to harvested cells derived from species amenable to the Federal Meat Inspection Act (FMIA; 21 U.S.C. 601 et seq.) or Poultry Products Inspection Act (PPIA; 21 U.S.C. 451 et seq.) . . . and intended for use as human foods as ‘cell-cultured’ meat and poultry food products . . .”).

185. See *Formal Agreement*, *supra* note 97.

also issued regulations regarding the ingredients that cell-cultivated producers must adhere to in their processes.¹⁸⁶

The MOU also empowers the FDA to create a premarket consultation system for food made with cultivated animal cells.¹⁸⁷ This requires an initial submission, an administrative response, and a supporting scientific memo.¹⁸⁸ Pursuant to this agreement, the FDA also “ensure[s] that labeling of cell cultured products derived from animal species not subject to USDA jurisdiction is truthful and not misleading, consistent with coordinated FDA and USDA-FSIS principles for product labeling and claims.”¹⁸⁹ To date, four cell-cultivated meat products have gone through the premarket consultation process, all of which have been cleared as being safe for consumption.¹⁹⁰ The first two of these products from GOOD Meats and UPSIDE Foods are both cell-cultivated chicken, and each went through the FSIS and FDA approval process in 2023.¹⁹¹ While they were served for a short time at restaurants in U.S. cities, neither has been sold directly to consumers in a supermarket setting.¹⁹² In May of 2025, the FDA cleared Wildtype’s sushi-grade

186. See, e.g., *FSIS Responsibilities*, supra note 184 (“Ingredients . . . used in cell-cultured meat or poultry food products . . . must be considered safe and suitable by FSIS and used in accordance with the intended use listed in 9 CFR 424.21(c) . . . or FSIS Directive 7120.1 . . .”).

187. *Formal Agreement*, supra note 97.

188. *Inventory of Completed Pre-Market Consultations for Human Food Made with Cultured Animal Cells*, FDA (Mar. 7, 2025), <https://www.fda.gov/food/human-food-made-cultured-animal-cells/inventory-completed-pre-market-consultations-human-food-made-cultured-animal-cells> [<https://perma.cc/6WVN-WAV5>].

189. *Human Food Made with Cultured Animal Cells*, FDA (Mar. 7, 2025), <https://www.fda.gov/food/food-ingredients-packaging/human-food-made-cultured-animal-cells> [<https://perma.cc/J88C-3XXX>].

190. See Letter from Mary D. Ditto, Off. of Food Additive Safety Ctr. for Food Safety & Applied Nutrition, to Kathryn Ang, GOOD Meat, Inc. (June 9, 2023), <https://www.fda.gov/media/169702/download?attachment> [<https://perma.cc/H6CQ-AJ8B>] (“GOOD Meat’s conclusion that foods comprised of or containing the cultured cellular material resulting from the production process defined in CCC 000001 are as safe as comparable foods produced by other methods and would not contain substances that adulterate the food.”); Letter from Kristi L. Muldoon-Jacobs, Off. of Food Additive Safety Ctr. for Food Safety & Applied Nutrition, to Nicole Berzins, UPSIDE Foods, Inc. (Apr. 13, 2023), <https://www.fda.gov/media/167308/download?attachment> [<https://perma.cc/6EG8-VZMV>] (declaring UPSIDE Foods’s cell-grown chicken food safe).

191. See sources cited supra note 190.

192. See Ashlen Wilder, *The First Two Restaurants Serving Cultivated Meat in the U.S.*, SANTE MAG. (Aug. 1, 2023), <https://santemagazine.com/the-first-two-restaurants-serving-cultivated-meat-in-the-u-s/> [<https://perma.cc/D7TU-UXRW>]; Tierney Plumb, *José Andrés Is*

salmon for sale on the U.S. market, noting, “We have no questions at this time regarding Wildtype’s conclusion that foods comprised of or containing cultured salmon cell material resulting from the production process defined in CCC 000005 are as safe as comparable foods produced by other methods.”¹⁹³ Shortly thereafter, Wildtype’s salmon debuted nationally in Portland, Oregon in June.¹⁹⁴ A twelve-person Japanese tasting restaurant in Austin, Texas, followed shortly thereafter in July of 2025, with positive press.¹⁹⁵ In August of 2025, Wildtype plans to debut its salmon in California as well.¹⁹⁶ The final form of cell-cultivated meat approved for the U.S. market is a pork fat made by a company called Mission Barns, which received FDA approval in March of 2025,¹⁹⁷ and cleared its final regulatory hurdle

the First Chef to Serve Good Meat’s ‘No-Kill’ Chicken in the U.S., EATER: WASH., D.C. (July 6, 2023, at 14:17 CDT), <https://dc.eater.com/2023/7/6/23785994/jose-andres-chicken-good-meat-china-chilcan> [<https://perma.cc/SY6P-MJWL>]; Danielle Wiener-Bronner, *Lab-Grown Chicken Debuts in San Francisco Restaurant*, CNN BUS. (July 1, 2023, at 15:32 EDT), <https://edition.cnn.com/2023/07/01/business/lab-grown-chicken-san-francisco/index.html> [<https://perma.cc/2BS6-C768>].

193. Letter from Mark A. Hartman, Off. of Food Chem. Safety, Dietary Supplements, & Innovation Hum. Foods Program, to Justin L. Kolbeck, Wildtype, Inc. (May 28, 2025), <https://www.fda.gov/media/186752/download> [<https://perma.cc/6LAW-FC66>]; see also Memorandum from Ashley Nazario Toole, Innovative Foods Staff, to Administrative File, CCC 000005 (May 28, 2025), <https://www.fda.gov/media/186753/download> [<https://perma.cc/H2QV-R8WU>] (detailing full scientific process and outcomes).

194. Margherita Bassi, *Lab-Grown Salmon Hits the Menu at an Oregon Restaurant as the FDA Greenlights the Cell-Cultured Product*, SMITHSONIAN MAG. (June 11, 2025), <https://www.smithsonianmag.com/smart-news/lab-grown-salmon-hits-the-menu-at-an-oregon-restaurant-as-the-fda-greenlights-the-cell-cultured-product-180986769/> [<https://perma.cc/PTK3-Y7E7>] (“Wildtype’s salmon is only appearing on Kann’s menu on Thursday nights in June, but it will become available every day in July. It’s also set to debut in four more restaurants over the coming four months.”).

195. See Natalie Grigson, *Austin Sushi Restaurant Debuts Lab-Grown Salmon Made from Fish Cells*, CULTURE MAP AUS. (July 28, 2025, at 16:52 CT), <https://austin.culturemap.com/news/restaurants-bars/otoko-wildtype-cultivated-salmon-lab/> [<https://perma.cc/E69L-2JVJ>] (reporting that Austin based restaurant Otoko “is now offering cultivated salmon by a company called Wildtype . . . [A] delicious and eco-friendly new protein.”).

196. Patrick Hoge, *Restaurant to Be First in SF to Offer Cell-Grown Salmon*, SF WKLY. (July 30, 2025), https://www.sfweekly.com/dining/robin-sf-to-offer-wildtype-cell-grown-salmon-in-local-first/article_a9e3acfb-bbf9-42bb-8876-86100bb95e44.html [<https://perma.cc/5YPV-HLMJ>].

197. Letter from Mark A. Hartman, Off. of Food Chem. Safety, Dietary Supplements, & Innovation Hum. Foods Program, to Eitan Fischer, Mission Barns (Mar. 7, 2025), <https://www.fda.gov/media/185742/download> [<https://perma.cc/XH4W-ETKB>].

by receiving a FSIS grant of inspection in July of 2025.¹⁹⁸ The company, which will produce meatballs and bacon that combine plant protein with cell-cultured animal fat, is the first to have products available for domestic retail purchase as it plans to market not only to restaurants but to the grocery store Sprouts.¹⁹⁹

C. State Laws Roasting Cell-Cultivated Meat

While the federal level appears relatively unfazed by the advent of cell-cultivated meat, state lawmakers have turned their attention to the product, aggressively pursuing not only labeling requirements but going as far as seeking to limit the development, import, or sale of cell-cultivated meat.²⁰⁰ These actions far exceed even the most stringent legal action taken for conventional meat competitors, like genetically modified animals and plant-based meat alternatives.²⁰¹

Several states have enacted specific labeling requirements for cell-cultured food, not unlike the restrictions they have placed or attempted to place on plant-based meat alternatives. Some of these laws, like those in Georgia, Wyoming, and Iowa, require that cell-cultured meat producers include clarifying terms on their packaging.²⁰² Georgia law requires that cell-cultured products state that they are “lab-grown,” “lab-created,” or “grown in a lab” “prominently and conspicuously on the front of the package.”²⁰³ Wyoming also mandates that cell-cultured products be clearly labeled as “containing cell cultured product.”²⁰⁴ Iowa, one of the most recent additions in this space, requires companies marketing a conventional meat alternative couple the use of an “identifying meat term” on the packaging, with a visibly proximate “qualifying term” clarifying that a product is from a “cultivated-protein” or “insect-protein” product.²⁰⁵

However, other jurisdictions continue to try to enforce a monopoly on the term “meat” only for use as applied to conventional livestock production (despite

198. Eadie, *supra* note 40.

199. *Id.*

200. *See, e.g.*, WYO. STAT. ANN. § 35-7-119(e)(ii) (2025) (limiting plant-based products to those consistent with the statute’s definition of meat).

201. *See supra* Part III.A.2.

202. GA. CODE ANN. § 26-2-152(c)(1)(B)(2) (2025); WYO. STAT. ANN. § 35-7-119(e)(ii) (2025); IOWA CODE §§ 137E.1, 137E.3 (2025).

203. GA. CODE ANN. § 26-2-152(c)(1)(B)(2) (2025).

204. WYO. STAT. ANN. § 35-7-119(e)(ii) (2025).

205. IOWA CODE §§ 137E.1, 137E.3 (2025).

setbacks in the plant-based labeling context).²⁰⁶ In Kentucky and Alabama, calling cell-cultured food a “meat” or “meat product” is considered presumptive misbranding²⁰⁷ despite the fact that there is no evidence of any molecular difference between meat whose cells are duplicated in a lab versus an animal’s body.²⁰⁸ Likewise, Louisiana and Mississippi legally define “meat,” as part of an animal “carcass” but Louisiana takes care to also note that this “does not include a . . . [c]ell cultured food product grown in a laboratory from animal cells.”²⁰⁹ In Mississippi, Louisiana, Missouri, North Dakota, and South Carolina, calling anything “meat” that (1) is not from a carcass or (2) made from animal cells reproduced outside of an animal’s body is legally defined as misbranding.²¹⁰ Ohio and Oklahoma require labeling that prohibits the use of terms like “meat” or “egg” without a “qualifying term” on the package such as “grown in a lab,” “fake,” or “imitation.”²¹¹

206. See, e.g., KY. REV. STAT. ANN. § 217.035 (West 2025); ALA. CODE § 2-17-10(d) (2025).

207. KY. REV. STAT. ANN. § 217.035 (West 2025) (“A food shall be deemed to be misbranded. . . . (15) If it purports to be or is represented as meat or a meat product and it contains any cultured animal tissue produced from in vitro animal cell cultures outside of the organism from which it is derived.”); ALA. CODE § 2-17-10(d) (2025) (“A food product that contains cultured animal tissue produced from animal cell cultures outside of the organism from which it is derived may not be labeled as meat or a meat food product.”).

208. Memorandum from Jessica Mills, Innovative Foods Staff, to Administrative File, CCC 000039 (July 24, 2025), <https://www.fda.gov/media/188065/download> [<https://perma.cc/4DE9-E3P4>].

209. LA. STAT. ANN. § 3:4743(10) (2025); MISS. CODE ANN. § 75-35-3(g) (2025) (“The term ‘meat food product’ means any product capable of use as human food which is made wholly or in part from any meat or other portion of the carcass of any cattle, sheep, swine, or goats.”).

210. LA. STAT. ANN. § 3:4744(B)(4) (2025) (discussing misbranding of meat generally as related to various animal carcasses); *id.* § 3:4744(B)(11) (discussing cell-cultured products specifically and forbidding “[r]epresenting a cell cultured food product as a meat product”); MISS. CODE ANN. § 75-35-15(4)(a) (2025) (“A food product . . . that contains cultured animal tissue produced from animal cell cultures outside of the organism from which it is derived shall not be . . . [l]abeled as meat or a meat-food product.”); MO. REV. STAT. § 265.494(7) (2025) (“[M]isrepresenting a product as meat that is not derived from harvested production livestock or poultry[.]”); N.D. CENT. CODE § 4.1-31-05.1(1) (2025) (“A person may not advertise, offer for sale, sell, or misrepresent cell-cultured protein as a meat food product.”); S.C. CODE ANN. § 47-17-510(B) (2025) (stating that is unlawful “to label any artificial or cell-cultivated food product as beef, poultry, fish, crustacean, or any other animal protein”); S.D. CODIFIED LAWS § 39-5-6(13) (2025) (defining meat as “the edible part of the muscle of cattle, bison, sheep, swine, goats, equine, ratites, captive cervidae, and other species”).

211. OKLA. STAT. tit. 63, § 1-150 (effective Nov. 1, 2025); OHIO REV. CODE ANN. § 3715.601–.605 (West 2025).

However, highly codified labeling was only the first wave of state legislation targeting cell-cultivated meat.²¹² The years since the approval of actual cell-cultivated meat products for market by the FSIS and FDA in 2023 have seen an explosion of state level legislative activity banning cell-cultivated meat altogether, many of which include criminal penalties.²¹³ At least thirteen states have considered the issue with seven jurisdictions now placing moratoriums on cell-based meats—five in the 2025 calendar year alone.²¹⁴ Florida led the charge beyond labeling limitations in early 2024, becoming the first state to enact a ban of cell-cultivated meat.²¹⁵ The Florida statute creates penalties, “for any person to manufacture for sale, sell, hold or offer for sale, or distribute cultivated meat in this state.”²¹⁶ Criminal penalties of up to 60 days’ confinement and a \$500 fine attach to an individual who knowingly engages in these actions.²¹⁷ Business entities risk disciplinary action which can include fines and revocation or

212. BENSON & GREENE, *supra* note 12, at 13.

213. *See Cell-Cultured Meat Updates: State Bans, Labeling Requirements, and Regulatory Clarifications*, *supra* note 106.

214. MACKENZIE BATTLE ET AL., GOOD FOOD INST., 2024 STATE OF THE INDUSTRY: CULTIVATED MEAT, SEAFOOD, AND INGREDIENTS 6 (Jessica Colley Clarke, Liz Fathman & Tara Foss eds., 2025), <https://gfi.org/wp-content/uploads/2025/04/2024-State-of-the-Industry-Cultivated-meat-seafood-and-ingredients-GFI.pdf> [<https://perma.cc/N5XR-TCCW>] (noting 12 jurisdictions in the United States in 2024 considering cultivated meat bans). Oklahoma also proposed a state ban on the manufacture, sale, holding or distribution of cell-cultivated meat in 2026, however the proposal has not yet made it to the full legislative session. *See* S.B. 2121, 60th Leg., 2nd Reg. Sess. (Okla. 2026); *see also* Emily Stone, Jakob Christopherson & Emily Whitest, *Alternative Protein Laws State Compilation*, NAT’L AGRIC. L. CTR. (Sep. 9, 2025), <https://nationalaglawcenter.org/state-compilations/alternative-protein-laws-state-compilation/> [<https://perma.cc/225V-8QP5>] (listing seven jurisdictions banning cell cultured meat).

215. *See* FLA. STAT. § 500.452(1) (2025). One other country, Italy, banned the production and sale of cell-cultivated meat in late 2023. Paul Kirby, *Italy Bans Lab-Grown Meat in Nod to Farmers*, BBC (Nov. 17, 2023), <https://www.bbc.com/news/world-europe-67448116> [<https://perma.cc/G3V7-WLJE>] (observing that the bill passed parliament easily by a vote of 159 to 53). Parties who breach the law can incur fines of up to €60,000. *Id.* No evidence of any enforcement actions of this law have been found yet, and it is dubious whether this law will remain valid long-term as it has allegedly violated EU procedure and would be subject to challenge at the European Commission should cell-cultivated meats be approved by the EU food-approval process. *Italy Bans Lab-Grown Meat, Violating EU Procedure*, OSBORNE CLARKE (May 3, 2024), <https://www.osborneclarke.com/insights/italy-bans-lab-grown-meat-violating-eu-procedure> [<https://perma.cc/Q9LB-GGE8>] (noting that Italy’s law was “adopted before the end of the standstill period laid down by Directive (EU) 2015/1535, and in doing so, Italy violated a key EU scrutiny procedure”).

216. FLA. STAT. § 500.452(1) (2025).

217. *Id.* §§ 775.082(4)(b), 775.083(e).

suspension of any licenses to engage in business.²¹⁸ Alabama joined Florida shortly after and enacted a law prohibiting “any person to manufacture, sell, hold or offer for sale, or distribute any cultivated food product in [Alabama].”²¹⁹

It was not until a year later that the newest wave of bans on cell-cultured meat was signed into law. Within a matter of a few months, five new jurisdictions joined Florida and Alabama in their quest to ban cell-cultured meat.²²⁰ In April of 2025, Mississippi passed its own cell-cultivated meat ban practically reciting the language of Alabama’s statute, which went into effect on July 1, 2025.²²¹ On May 1, 2025, Montana’s governor signed a moratorium on cell-cultivated meat after the bill flew through the legislative process at a breakneck pace.²²² Montana’s law carries with it strong enforcement teeth; the attendant implementation and enforcement plan will create 16 full-time state employee positions at the Department of Public Health and Human Services, at an estimated first-year cost of \$38.9 million.²²³ That same week, Indiana’s governor signed a law placing a two-year moratorium on the sale and manufacture of cell-cultivated meat also starting on July 1, 2025.²²⁴ The Indiana version of this law carries with it the highest potential civil penalty to date at \$10,000.²²⁵ Nebraska’s cell-cultivated meat ban, strenuously pushed forward by the governor of Nebraska and signed into law on May 20, 2025, amends Nebraska’s “adulterated food” provision to “deem[] cultivated- protein food products to be adulterated.”²²⁶ In doing so, it created one

218. *Id.* §§ 500.121(1)(b), 570.971(1)(b).

219. ALA. CODE § 20-1-161 (2025); *id.* § 20-1-160 (“‘[C]ultivated food product’ means any food product produced from cultured animal cells.”).

220. H.B. 1006, 2025 Reg. Sess. (Miss. 2025); H.B. 401, 69th Leg. (Mont. 2025); H.E.A. 1425, 124th Gen. Assemb., Reg. Sess. (Ind. 2025); NEB. REV. STAT. § 81-2,282(2)(e) (2025); S.B. 261, 89th Leg., Reg. Sess. (Tex. 2025).

221. H.B. 1006, 2025 Reg. Sess. (Miss. 2025).

222. H.B. 401, 69th Leg. (Mont. 2025) (showing less than three months between committee action to the signing of the bill).

223. *Enforcement Plan Is Evidence That Montana Is Serious About Banning Lab-Grown Meat*, FOOD PROD. SOLS. ASS’N (May 14, 2025), <https://fpsa.org/news/enforcement-plan-is-evidence-that-montana-is-serious-about-banning-lab-grown-meat/> [https://perma.cc/KJZ5-VXDD].

224. H.E.A. 1425, 124th Gen. Assemb., Reg. Sess. (Ind. 2025) (“A person shall not: (1) sell; (2) offer for sale; or (3) manufacture; a cultivated meat product in Indiana during the period beginning July 1, 2025, and ending June 30, 2027.”).

225. *Id.*

226. *See* Press Release, Off. of the Governor, Gov. Pillen Signs Legislation Banning Fake Meat in Nebraska (May 20, 2025), <https://governor.nebraska.gov/gov-pillen-signs-legislation-banning-fake-meat-nebraska> [https://perma.cc/Y2MV-SH7T] (noting that the bill originated

of the harshest anti-cell-cultured meat laws by encompassing a broader range of commercial activities than those listed in other states' statutes.²²⁷ The statute now reads: "No person shall adulterate any food or manufacture, produce, import, distribute, promote, display for sale, offer for sale, attempt to sell or sell any adulterated food."²²⁸

The most recent ban on cell-cultivated meat was approved in June 2025, when Texas Governor Greg Abbott signed Senate Bill 261 into law.²²⁹ This law went into effect on September 1, 2025, and is narrower than many of the other states bans in that it only forbids offering for sale or the sale of cell-cultivated meat.²³⁰ The Texas law is also limited to two years and has an expiration date of September 2027.²³¹ This law is the only one that directly impacts actual, rather than imagined or projected, business. Austin based Japanese restaurant Otoko, which featured Wildtype salmon, ceased sales before September 1, 2025, to avoid sanction under the new law.²³²

D. Companies' Beef with States: Pending Litigation

Shortly after the passing of Florida's bill prohibiting the manufacture, distribution, or sale of cell-cultivated meat, UPSIDE Foods filed a lawsuit in the Northern District of Florida, challenging the law as unconstitutional.²³³ The lawsuit alleges that Florida's law violates the Supremacy Clause by undermining the sale of meat approved through the joint governance structure of the USDA, the FDA,

from the Governor's "effort to protect producers and consumers from the fake meat industry" and that "[t]he bill was sponsored on the Governor's behalf by Senator Barry DeKay"); Erin Bamer, *Gov. Jim Pillen Celebrates Nebraska Ban on Lab-Grown Meat at O'Neill Butcher Shop*, NEB. EXAM'R (July 17, 2025, at 14:28 CT), <https://nebraskaexaminer.com/2025/07/17/gov-jim-pillen-celebrates-nebraska-ban-on-lab-grown-meat-at-oneill-butcher-shop/> [<https://perma.cc/HLL5-MD2W>] (reporting on Nebraska Governor Pillen's support for banning cell-cultivated meat).

227. Contrast NEB. REV. STAT. § 81-2,282(2)(e) (2025), with H.E.A. 1425, 124th Gen. Assemb., Reg. Sess. (Ind. 2025).

228. NEB. REV. STAT. § 81-2,282(1) (2025).

229. See S.B. 261, 89th Leg., Reg. Sess. (Tex. 2025).

230. *Id.*

231. *Id.* § 2(c).

232. Grigson, *supra* note 195 ("While Otoko is thrilled to explore such groundbreaking innovation, the restaurant is also committed to abiding by the recent changes in Texas legislation Those interested in trying Wildtype are encouraged to visit before September 1.").

233. First Amended Complaint for Declaratory and Injunctive Relief at 2, Upside Foods, Inc. v. Simpson, No. 4:24-cv-000316-MW-MAF (N.D. Fla. Nov. 1, 2024).

and related federal statutes.²³⁴ The complaint also argues that Florida's law discriminates against interstate commerce by engaging in economic protectionism that discriminates against out-of-state competitors (cell-cultivated meat) to the benefit of in-state livestock interests.²³⁵ In April of 2025, Chief Judge Mark Walker of the U.S. District Court for the Northern District of Florida partially denied the State's motion to dismiss, giving UPSIDE Foods the ability to continue its challenge of Florida's trailblazing ban on cultivated meat.²³⁶

IV. WHAT IS (AT) STEAK?

State-level legal barriers to the consumer food market for cell-cultivated meat products appear counterintuitive when placed in the context of American rhetoric surrounding free markets and individual choice,²³⁷ public calls for cheaper more abundant food,²³⁸ the global taste for meat,²³⁹ the lack of food safety concerns,²⁴⁰ and the synergy of various social and economic benefits.²⁴¹ Yet, the reality is that more states are enacting unprecedented bans on cell-cultivated meat and at a faster clip.²⁴² Past competitors to conventional meat, like plant-based meat alternatives, faced legal and regulatory hurdles in reaching consumers, but these took the form of additional labeling requirements, claimed to alleviate consumer confusion.²⁴³ While state laws related to cell-cultured meat started with branding and marketing-related limitations, they quickly escalated to restrictive zero tolerance regimes completely eliminating any ability for cell-cultured meat to be manufactured, bought, or sold.²⁴⁴

234. *Id.* at 32–36 (detailing how the Supremacy Clause expressly preempts Senate Bill 1084 through federal laws regulating meat and poultry products).

235. *Id.* at 53–57 (outlining arguments faced on statements made by public officials indicating intent of the law is to engage in state-based market protectionism).

236. Order on Motion to Dismiss at 29, *Upside Foods, Inc. v. Simpson*, No. 4:24cv316-MW/MAF (N.D. Fla. Apr. 25, 2025).

237. See Isaac DeBlasio, *What's Really Behind State Bans on Lab-Grown Meat*, THE HILL (Aug. 19, 2025, at 07:00 ET), <https://thehill.com/opinion/campaign/5457139-the-hidden-motive-driving-state-bans-on-lab-grown-meat/> [<https://perma.cc/PC3F-LYX8>].

238. Scott Horsley, *Grocery Prices Have Jumped Up, and There's No Relief in Sight*, NPR (Sep. 19, 2025, at 05:30 ET), <https://www.npr.org/2025/09/19/nx-s1-5539547/grocery-prices-tariffs-food-inflation> [<https://perma.cc/4B37-TQ57>].

239. OECD-FAO AGRICULTURAL OUTLOOK, *supra* note 2, at 188.

240. Parshall, *supra* note 15.

241. See sources cited *supra* notes 236–39.

242. See *supra* Part III.C.

243. See *supra* Part III.C.

244. See *supra* Part III.C.

This Part explores reasons why states have taken the nuclear option where cell-cultivated meat is concerned. It concludes that while economic protectionism is a factor, this is only part of a broader picture. Rather, the social and cultural meaning of food, and meat as a food specifically, fuels this legal schism. Understanding this facet of the food system provides the missing piece needed to craft law that is effective. To reach lasting workable solutions, lawmakers must negotiate legal and regulatory structures in the food space with social and cultural meaning in mind.

A. Bringing Home the Bacon: Economic Protectionism

Bans of cell-cultured meat make no significant mention of concerns arising from historical and deep-seated food policy rationales—namely food safety, negative environmental impacts, or safeguards against consumer fraud that could be remedied through more stringent labeling laws.²⁴⁵ Indeed, free-market advocates argue that regulations banning cell-cultivated meat unduly interfere with economic development.²⁴⁶ They argue that consumers should be allowed to make the choices they want, rather than engaging in preemptive government action in these spaces.²⁴⁷ Adherents to this view favor clear labeling, which empowers consumers to make informed choices over taking away consumer choice entirely.²⁴⁸ However, these bans focus not on competition, but absolute protectionism of the conventional livestock and ranching industries, as well as poultry and fish farmers.²⁴⁹

245. See *supra* notes 237–40 and accompanying text.

246. See, e.g., DeBlasio, *supra* note 237.

247. See, e.g., *id.*

248. Juan Salinas II, *Lab-Grown Meat Ban Is Another Step Closer to Becoming Law in Nebraska*, NEB. EXAM’R (Apr. 22, 2025, at 13:07 CT), <https://nebraskaexaminer.com/2025/04/22/lab-grown-meat-ban-is-another-step-closer-to-becoming-law-in-nebraska/> [https://perma.cc/F6K3-FH4B] (discussing how some Nebraska lawmakers consider “labeling [as] a better option because it is a more free-market approach.”).

249. Economic protectionism of conventional meat producers is undoubtedly a significant part of the opposition to cell-cultured meat. *Governor Gianforte Bans Lab-Grown Meat in Montana*, MONTANA.GOV (May 13, 2025), https://news.mt.gov/Governors-Office/Governor_Gianforte_Bans_Lab-Grown_Meat_in_Montana [https://perma.cc/V8XB-HPW6].

As Chairman of the House Agriculture Committee and someone whose family has been involved in Montana’s meat processing industry for over 80 years, I’m proud Governor Gianforte signed House Bill 401 into law,” Rep. Mitchell said. “Agriculture is our state’s number one industry, and this bill takes a clear stand to protect our

This is hardly a shocking development; the conventional U.S. meat industry has engaged in over 100 years of often aggressive anticompetitive behavior. Consolidation of the meat industry was so intense in the early twentieth century that it led to Congress passing the Stockyard and Packers Act (PSA) of 1921 which sought to facilitate fair competition and counter the economic juggernaut that had formed between five dominant meatpacking companies.²⁵⁰ It did so by prohibiting “undue or unreasonable preference or advantage” and disallowing any producers to engage in, “unfair, unjustly discriminatory, or deceptive practice or device.”²⁵¹ Throughout the years the USDA has attempted to enforce this law through additional rules and enforcement actions.²⁵² Despite those efforts, the meat industry continues to have a high level of market concentration and faces persistent antitrust challenges.²⁵³

ranchers and our food supply. We won't let synthetic products with misleading labels undercut the hard work of Montana's farm and ranch families.

Id.

250. *The Packers and Stockyards Act: An Overview*, NAT'L AGRIC. L. CTR., <https://nationalaglawcenter.org/overview/packers-and-stockyards/> [https://perma.cc/ZRZ9-5MPA] (relaying that the PSA “was enacted in response to concerns that the ‘Big Five’ large meat packers- Swift & Company, Armour & Company, Cudahy Packing Company, Wilson & Company, and Morris & Company had engaged in anticompetitive practices that had a deleterious effect on producers and consumers.”).

251. 7 U.S.C. § 192(a)–(b). To review the PSA overall, see 7 U.S.C. §§ 181–229.

252. *See, e.g.*, 9 C.F.R. §§ 201–06 (2025) (all regulations promulgated pursuant to the PSA); Transparency in Poultry Grower Contracting and Tournaments, 88 Fed. Reg. 83210 (Nov. 28, 2023) (to be codified at 9 C.F.R. pt. 201) (a final rule amending, “the regulations under the Packers and Stockyards Act, 1921 (Act), to add disclosures and information that live poultry dealers engaged in the production of broilers must furnish . . .”); Press Release, USDA, USDA Announces Farmer Fair Practices Rules - Clarifications for Industry & Protections for Farmers (Dec. 14, 2016), <https://www.usda.gov/about-usda/news/press-releases/2016/12/14/usda-announces-farmer-fair-practices-rules-clarifications-industry-protections-farmers> [https://perma.cc/3K2W-DQZ2].

253. *See* Brian Deese, Sameera Fazili & Bharat Ramamurti, *Addressing Concentration in the Meat-Processing Industry to Lower Food Prices for American Families*, BIDEN WHITE HOUSE: BLOG (Sep. 8, 2021), <https://bidenwhitehouse.archives.gov/briefing-room/blog/2021/09/08/addressing-concentration-in-the-meat-processing-industry-to-lower-food-prices-for-american-families/> [https://perma.cc/X79S-GXVN] (discussing how the meat processing industry has become increasingly consolidated in the last 50 years); Mónica Cordero, *GRAPHIC: USDA Has Initiated 250 Antitrust Enforcement Actions Since 2016*, INVESTIGATE MIDWEST (Nov. 17, 2023), <https://investigate-midwest.org/2023/11/17/graphic-usda-has-initiated-250-antitrust-enforcement-actions-since-2016/> [https://perma.cc/4C6S-VRJJ] (visually summarizing the activity of the USDA in attempting to policy antitrust violations in the meat and poultry sectors with over 250 enforcement actions).

While the powerful conventional meat lobby has made very few inroads on obtaining anti-cell-cultivated meat policies at the federal level,²⁵⁴ legislation banning cell-cultivated meat at the state level clearly seeks to economically protect the existing agricultural industry, especially cattle ranchers.²⁵⁵ This holds true despite the fact that as a matter of actual sales, currently there is no real threat to the U.S. meat market from cell-cultivated meat and likely won't be for some time—if ever.²⁵⁶ Experts attribute this to the costs of cell-cultivated meat, which renders these products unaffordable for the foreseeable future.²⁵⁷ Some biotech industry specialists argue that the likelihood of cell-cultivated meat making up even 10 percent of the U.S. market is vanishingly small.²⁵⁸ Moreover, the beef

254. At the federal level, conventional livestock producers have been making their case through lobbying to limited degrees of success. The Department of Defense revoked an open call for proposals to develop nutrient dense cell-cultivated meat for U.S. Military use after direct lobbying efforts from the National Cattlemen's Beef Association (NCBA). Anay Mridul, *US Government Revokes Funding Call for Military Cultivated Meat Scheme After Lobby Pressure*, GREEN QUEEN (July 29, 2024), <https://www.greenqueen.com.hk/us-government-department-of-defence-lab-grown-meat-military-ncba/> [https://perma.cc/D29R-YT3X].

255. See Salinas II, *supra* note 248 (reporting that State Senator Teresa Ibach voted to ban cell-cultured meat “because cattle is [Nebraska’s] number one industry . . . I will do everything to protect that. Banning it is not a bad thing.”); Barbara Hoberock, *Oklahoma Panel Passes Measure to Ban Lab-Grown Meat*, OKLA. VOICE (Feb. 9, 2026, at 13:22 CT), <https://oklahomavoices.com/2026/02/09/oklahoma-panel-passes-measure-to-ban-lab-grown-meat/> [https://perma.cc/BV2K-FWAJ] (reporting that the senate bill banning cell-cultured meat “was designed to protect the agriculture industry” and that Senator Murdock noted, “[t]his is a battle of long-term survival of the cattle industry[.]”).

256. Market protectionism rationales may seem premature or alarmist, given that very little cell-cultivated meat is actually available to American consumers. Therefore, there is currently no real threat to the U.S. meat market from cell-cultivated meat generally, and no foreseeable product equivalent to beef products specifically. See Parshall, *supra* note 15.

257. See David Humbird, *Scale-Up Economics for Cultured Meat*, 118 BIOTECHNOLOGY & BIOENGINEERING 3239, 3239 (2021) (enumerating how various high-cost factors including “[l]ow growth rate, metabolic inefficiency, catabolite inhibition, and shear-induced cell damage will all limit practical bioreactor volume and attainable cell density. Equipment and facilities with adequate microbial contamination safeguards have high capital costs. The projected costs of suitably pure amino acids and protein growth factors are also high.”).

258. See, e.g., Fassler, *supra* note 11 (“If I was going to put odds on it, the odds would be zero.”). But see *Myth: The Disruption of Food and Agriculture Means That in the Future There Will Be No Meat Available From Animals*, RETHINKX (May 6, 2024), <https://www.rethinkx.com/faq-and-mythbusting/the-disruption-of-food-and-agriculture-means-that-in-the-future-there-will-be-no-meat-available-from-animals> [https://perma.cc/M23M-SGPX] (“We are on the cusp of the deepest, fastest, most consequential disruption in food and agricultural production since the first domestication of plants and animals 10,000 years ago. Although traditional meat will still be available, it will become expensive, niche and supplied

industry knows from experience that the introduction of competitive products does not necessarily lead to lasting economic harm.²⁵⁹ Conventional meat products often withstand competition.²⁶⁰ For example, industry concerns over plant-based meat alternatives proved to be exaggerated.²⁶¹ While there was an initial spike in consumer interest, that growth leveled off as other factors, particularly cost, pushed consumers away from the product.²⁶² Rather than cutting into the conventional meat market, the plant-based meat alternative's market has slowed over time.²⁶³

B. *Something to Chew On: Food, Culture, & Identities*

There must be more to the story of why cell-cultivated meat is being banned in jurisdictions throughout the United States, while products with direct consumer impacts, like vegetarian meat-alternatives or genetically modified salmon, receive nothing more than supplemental labeling requirements. What is it that some find so deeply offensive about cell-cultured meat? This Subpart identifies four strains of social and cultural arguments that underpin these legal trends: (1) nature and God; (2) tradition and a way of life; (3) masculinity; and (4) class.²⁶⁴ Each of these topics breaks with the conventions of food law, which considers food only as a substance, and looks at food as a process. The issue in these Subparts is not on *what* is being made (which is molecularly identical), but *how* it is being made.²⁶⁵

by artisans. This is because the disruption is primarily a protein disruption driven by economics. The cost of modern proteins will be five times cheaper than existing animal proteins by 2030 and 10 times cheaper by 2035.”).

259. See, e.g., Robbie Lockie, *From \$1.3 Billion to Decline: The Future of Plant-Based Meat Lies in Innovation*, FREEDOM FOOD ALL. (Sep. 24, 2024), <https://www.freedomfoodalliance.org/unfork-the-food-system/decline-the-future-of-plant-based-meat-lies-in-innovation> [<https://perma.cc/7YWY-3XTV>] (discussing the challenges of the meat-alternative market).

260. *Id.*

261. See *id.*

262. See *id.* (“[D]espite reaching \$1.3 billion in sales in 2020, the meat alternatives category has faced significant challenges,” including “the price gap between meat alternatives and traditional meat.”).

263. See *id.*

264. See, e.g., Tai, *supra* note 102, at 765–66 (noting in some Asian cultures, non-animal meat analogues, particularly soy, have carried significant culture weight for hundreds and even thousands of years).

265. See Katie Jones, *A Visual Guide to the Science Behind Cultured Meat*, VISUAL CAPITALIST (June 15, 2022), <https://www.visualcapitalist.com/sp/a-visual-guide-to-the-science-behind-cultured-meat/> [<https://perma.cc/HRY5-PSA9>] (discussing the engineering behind cultured meat).

1. *God & Nature*

Cell cultivation removes meat production from the natural life cycle of an animal.²⁶⁶ No animal is born, no animal dies. One can also approach this realization with a more philosophical outlook: cell-cultivated meat threatens a longstanding daily assertion of the primacy of humans.²⁶⁷ If there is no longer a living animal needed in the production of meat, then arguably there is no food chain in the sense of species hierarchy.²⁶⁸ Moreover, this is a hierarchy that Christians believe is ordained by God.²⁶⁹ As the flesh from cell-cultivated meat is rendered industrial and attenuated in its relationship to the divine, it is differentiated from cell-cultivated meat. Put directly, “Cultured meat is made by man. Real meat is made by God himself.”²⁷⁰

This concept is culturally internalized in more secular terms through the juxtaposition of “natural” food, which is viewed as good, versus unnatural food.²⁷¹ Aversion to what is unnatural is deeply emotionally resonant.²⁷² Tactics used to pass anti-lab-grown meats play on this pro-nature visceral reactions of politicians and the public.²⁷³ In Italy, Senator and Professor of Biology Elena Cattaneo explained the Italian ban on cell-cultivated meat as an, “emotive, cartoon-style leaflet that classed natural food as good and cultivated food as bad and made from ‘crazy cells in bioreactors.’”²⁷⁴ In discussing the need for a cell-cultivated meat ban, Mississippi Commissioner of Agriculture and Commerce Andy Gipson declared, “consumers deserve to know the beef, poultry and pork purchased and

266. *See id.*

267. *See* MAUREEN OGLE, IN MEAT WE TRUST: AN UNEXPECTED HISTORY OF CARNIVORE AMERICA 2–3 (2013) (discussing the connection between concepts of civilization, pioneer settlement, livestock, and godliness).

268. *See* Cynthia Louise Grier, *On the Ecological Pyramid, Where are People Located?*, ECOLOGICLIFE.COM (June 15, 2025), <https://ecologiclife.com/on-the-ecological-pyramid-where-are-people-located.html> [<https://perma.cc/384Z-8MUL>] (explaining that food-chain hierarchies depend on eating living organisms, so without a living animal in meat production, the usual species hierarchy does not apply).

269. *See, e.g.,* Genesis 1:28 (stating humans shall “have dominion over the fish of the sea, over the birds of the air, and over every living thing that moves on the earth”).

270. Chris Mattox, *It’s Alive: The Legislative Response to Cell-Cultured Synthetic Meat*, MULTISTATE (May 8, 2024), <https://www.multistate.us/insider/2024/5/8/its-alive-the-legislative-response-to-cell-cultured-synthetic-meat> [<https://perma.cc/V7RQ-VHAS>].

271. *See* Mridul, *supra* note 254 (“US cattle producers [who] raise the highest-quality beef in the world . . . [that is] wholesome, natural meat and not ultra-processed” to “lab-grown protein that is cooked up in a chemical-filled bioreactor”).

272. Parshall, *supra* note 15.

273. *See* Mattox, *supra* note 270.

274. Kirby, *supra* note 215.

served to their families is real farm-raised meat, not something cultivated in a petri-dish”²⁷⁵

On some level, associations with natural foods are in opposition to industrial food trends. Industrial food thinks of food not as part of a food system, but as a transactional means to “[p]rovide energy to power working human bodies.”²⁷⁶ This nutrition-driven mentality allowed for food to be fortified through measurement and qualification to improve health outcomes.²⁷⁷ However,

[t]his molecular understanding resulted in food becom[ing] something to be taken apart and put back together. I think of this as the Lego building block model of food: Rather than imagining bread as flour, water, yeast, and salt, if I instead think of it as a combination of sugars, starches, proteins, fats, and minerals in specific ratios, I can then identify potential points for carefully tinkering with bread.²⁷⁸

As food science evolved, policy discussions reduced food to a transactional functional input engineered for optimization of certain qualities (consider the stigmatizing of fats in the late 90s, the low-carbohydrate trends of early 2000s, or the current protein craze).²⁷⁹

However, the story of natural versus unnatural, the way God made a food, cannot be the whole story for the American consumer. Americans love artificial foods.²⁸⁰ Plant based meat-alternatives, GMOs, and a host of artificial dyes, sweeteners, and preservatives pervade the U.S. market with little to no opposition

275. Brooke Parker, *Mississippi Bans the Sale of Lab-Grown Meat*, WDAM (Apr. 9, 2025, at 11:26 CDT), <https://www.wdam.com/2025/04/09/mississippi-bans-sale-lab-grown-meat/> [<https://perma.cc/YM45-BES9>].

276. See Christy Spackman, *The Problem with Lab-Grown Meat*, SLATE (May 7, 2019, at 19:35 CT), <https://slate.com/technology/2019/05/lab-grown-meat-food-agriculture-system.html> [<https://perma.cc/RQE7-RWFL>].

277. See *id.*

278. *Id.*

279. See *id.*; Brittany Luse, *Protein Seems to Suddenly Be Everywhere. Here's Why*, NPR (Jan. 30, 2025, at 16:37 ET), <https://www.npr.org/2025/01/30/nx-s1-5270923/protein-seems-to-suddenly-be-everywhere-heres-why> [<https://perma.cc/7LUD-T7EW>] (noting protein has not been as stigmatizing as other nutrients, such as “the low-fat diets of the ‘90s or the Atkins low-carb craze of the 2000s.”).

280. See Julie Creswell, *No More Food Dye in Froot Loops? Not so Fast.*, N.Y. TIMES (Apr. 25, 2025), <https://www.nytimes.com/2025/04/25/business/rfk-jr-food-dye-ban-manufacturers.html> (discussing how Froot Loops marketed to Americans specifically make use of garish artificial dyes).

(and certainly no ban).²⁸¹ Perhaps cell-cultured meat is special and off-putting to people not purely because of a general anti-science skepticism, but because the idea of creating meat without life and death is deeply unsettling. It disrupts the long-held order of life on Earth.²⁸² The cultural meaning of meat is tied to life. If something cannot be meat unless it is dead, and it cannot be dead unless it was alive, and it cannot be alive unless it was born, and it cannot be born unless it was a whole animal, then cell-cultivated meat, cannot really be meat—no matter its biochemical content.²⁸³ It is this social meaning of food, defined by process and the human role within that process, that food law so often overlooks.

2. Tradition & Class

Politicians seeking approval for limitations on farm-based meat do not do so based on intellectual appeals. In discussing the Florida ban on cell-cultivated meat, no state official ever cited a food safety issue.²⁸⁴ Rather, the Florida Commissioner of Agriculture Wilton Simpson, like the Governor, focused on the social and cultural importance of conventional meat, stating: “We must protect our incredible farmers and the integrity of American agriculture. Lab-grown meat is a disgraceful attempt to undermine our proud traditions and prosperity, and is in direct opposition to authentic agriculture.”²⁸⁵

In evoking these bucolic images, politicians deliberately elicit emotional attachments to a traditional rural way of life. This practice has a time-honored

281. See *id.* (discussing the regulation and safety of artificial dyes); Roberts, *supra* note 108; *How GMOs Are Regulated in the United States*, *supra* note 155 (discussing the regulation and safety of GMOs).

282. See Tae Kyung Hong et al., *Current Issues and Technical Advances in Cultured Meat Production: A Review*, 41 FOOD SCI. ANIMAL RES. 355, 359 (2021) (“However, despite [] potential advantages of introducing cultured meat, many people [are] concern[ed] about food safety regarding [the] unnatural[-] perception of cultured meat.”).

283. Bamer, *supra* note 226 (“When anybody is talking about meat and it does not come from a live critter, a four-legged critter, it ain’t meat.”).

284. FLA. S. COMM. ON AGRIC., ANALYSIS OF S.B. 1084, 2024 Leg., Reg. Sess., at 18 (2024) (noting FDA and USDA oversight and that cell-cultured meat is produced in a “controlled environment and prepared using conventional food processing and packaging methods.”). Some argue that cell-based meat can be safer for consumers, as it avoids the contamination hazards associated with slaughter, including exposure to feces. See, e.g., Parshall, *supra* note 15 (noting that experts assert cell-based meat has “potential to be safer to consume than traditionally farmed meats”).

285. Vaidehi Mehta, *Why Have Florida and Alabama Made Lab-Grown Meat Illegal?*, FINDLAW: BLOG (Sep. 12, 2024), <https://www.findlaw.com/legalblogs/federal-courts/why-has-florida-and-alabama-made-lab-grown-meat-illegal/> [https://perma.cc/FR7F-MFVS].

history in the United States, as farm imagery and the virtue associated with the yeoman farmer trace their way back to the founding and the specific works of Thomas Jefferson.²⁸⁶ Children in the United States, regardless of region, grow up reading picture books presenting an idealized version of farm life, and often learn the names of farm animals, their sounds, and colors at a young age.²⁸⁷ Deliberately appealing to the cultural weight of tradition and raising animals for food, Florida Governor Ron Desantis signed Florida's law banning cell-cultivated meat before a backdrop of an idyllic red barn and members of the Florida Cattlemen's Association.²⁸⁸ Similarly, when approving a ban on cell-cultured meat, Montana Governor Greg Gianforte made clear his goals were not about protecting Montanans from a harmful and dangerous substance, but protecting them from a loss of their identity, stating: "By signing House Bill 401 into law, I am proud to defend our way of life"²⁸⁹

In signing Florida's ban on cell-cultivated meat, Governor Desantis also situated cell-cultivated meat as a harbinger of class dominance. Portraying the potential arrival of cell-cultivated meat as a class struggle between faceless elite groups and a populist agenda, he noted in his office's press release, "Today, Florida is fighting back against the global elite's plan to force the world to eat meat grown in a petri dish or bugs to achieve their authoritarian goals."²⁹⁰ This conception of cell-cultivated meat as a trojan horse of alien class and cultural values can also be seen when pitched as divisive 'us versus them' language:

286. Richard Hofstadter, *The Myth of the Happy Yeoman*, AM. HERITAGE (Apr. 1956), <https://www.americanheritage.com/myth-happy-yeoman> [https://perma.cc/78DP-NGRU] ("Thomas Jefferson and Hector St. John de Crèveceur admired the yeoman farmer not for his capacity to exploit opportunities and make money but for his honest industry, his independence, his frank spirit of equality, his ability to produce and enjoy a simple abundance.").

287. See HUMANE EDUC. ADVOCS. REACHING TCHRS. (HEART) & FARM SANCTUARY, EXPLORING THE LIVES OF FARM ANIMALS: LESSONS THAT TEACH COMPASSION GRADES K - 3, at 8–13 (2020), <https://teachheart.org/wp-content/uploads/2021/03/Exploring-the-Lives-of-Farm-Animals-K-3-Guide.pdf> [https://perma.cc/MWW7-C46U] ("[A]ffection for farm animals is fostered by traditional children's storybooks, toys, and movies.").

288. See Owen Girard, *DeSantis Signs Bill Banning Lab-Grown Meat, Bolstering Agriculture*, FLA.'S VOICE (May 1, 2024), <https://flvoicenews.com/desantis-signs-bill-banning-lab-grown-meat-bolstering-agriculture/> [https://perma.cc/SL36-H4VN].

289. See *Governor Gianforte Bans Lab-Grown Meat in Montana*, *supra* note 249.

290. Press Release, Fla. Governor's Off., Governor DeSantis Signs Legislation to Keep Lab-Grown Meat Out of Florida (May 1, 2024), <https://www.flgov.com/eog/news/press/2024/governor-desantis-signs-legislation-keep-lab-grown-meat-out-florida> [https://perma.cc/FMP9-MEUD].

“Unlike the radical globalists pushing artificial man-made ‘foods,’ I stand with Mississippians who support our farmers and farm-raised meat.”²⁹¹

Meat is so deeply part of American culture that it is embedded in the very idioms English-speakers use to make sense of the world. A job applicant will speak of “beefing up” their credentials.²⁹² A sales associate will point out the quality of an item is “a cut above” the rest. In downsizing at work, executives discuss “trimming the fat,” making employees wonder if they “have the chops” or are they “dead meat.” But while Americans cringe from learning “how the sausage is made,” they still collectively dream of living “high on the hog.” I could go on—but there is no need to “ham it up.”

3. *Eat What you Kill: Meat, Masculinity, & Strength*

Culturally, meat and conceptions of manhood have long been intertwined.²⁹³ Whether consciously or unconsciously, in American society not eating meat is associated with being weak and effeminate.²⁹⁴ To eat meat is to be strong, dangerous, and tough.²⁹⁵ Because of protein’s connection to muscle growth, it is also associated with a certain archetype of masculinity.²⁹⁶ Take, for instance, Burger King’s commercial featuring large beef burgers and a man singing, “I am man, hear me roar . . . And I’m way too hungry to settle for chick food.”²⁹⁷

291. Parker, *supra* note 275.

292. See Garrett M. Broad, *Making Meat, Better: The Metaphors of Plant-Based and Cell-Based Meat Innovation*, 14 ENV’T COMM’N 919, 921–22 (2020) (exploring conceptual metaphors in the cell-based meat sector as extensions or rejections of “real” meat’s symbolic construction); Bettina Heinz & Ronald Lee, *Getting Down to the Meat: The Symbolic Construction of Meat Consumption*, 49 COMM’N STUD. 86, 86–87 (1998) (examining how meat metaphors hide the slaughter of animals while amplifying their desirability of being consumed); CAROL J. ADAMS, *THE SEXUAL POLITICS OF MEAT* 69 (2010) (establishing much of the early discourse around meat, politics, and conceptual metaphor).

293. See Rob Velzeboer et al., *Masculinity, Meat, and Veg*nism: A Scoping Review*, AM. J. MEN’S HEALTH, 2024, at 1, 1–2.

294. See *id.* at 2.

295. *Id.*

296. See Luse, *supra* note 279 (noting that protein has not been as stigmatizing as other nutrients because it is “the nutrient for men,” and that “there were so many men who had that same experience of being sold one type of, you know, body that could be achieved in only one kind of way.”).

297. *Id.*; COMMERCIALSINUSA, *I am Man!-Burger King Commercial* (YouTube, Oct. 19, 2008), <https://www.youtube.com/watch?v=sQCRHuaKpVk>.

Likewise, masculine hero of the internet Brian Johnson, who goes by the name “Liver King,” flaunts his muscular physique while eating raw meat.²⁹⁸

The procurement of meat is also inherently intertwined with violence. Meat was originally acquired through hunting with a weapon, either an arrow or a gun.²⁹⁹ Even when animals were domesticated, slaughter involved at minimum a sharp blade.³⁰⁰ There is a primal aspect to this image of masculinity: a real man is willing and able to kill animals. He does not feel remorse, moderation, or reluctance in taking an animal’s life for his own sustenance or enjoyment of the taste. In this ethos, man asserts his masculinity in the act of eating meat: he demonstrates that he is entitled to the lives of animals as he masters his place on the top of the food chain.³⁰¹ If he can’t kill directly, he at minimum will direct killing by proxy. To relinquish this apex place in the world is to be a “soy boy”—which is to say, feeble and less than a man.³⁰² This begs the questions: If no animal needs to die, and no man needs to hunt them or kill them—how can a man demonstrate he is at the top of the food chain? Can this male archetype be a man if not killing something to survive?

It is also important to note that legislation surrounding cell-cultivated meat is being proposed at a particularly gender-charged moment in American culture. The United States is suffering significant backlash in the wake of recent inroads by the me too, women’s, gay, and transgender rights movements.³⁰³ In response to critiques of toxic masculinity, there has been a resurgence of rhetoric and advocacy on behalf of traditional, “aggressive, [and] domineering alpha male” forms of

298. See LIVER KING, *Liver King - My Why* (YouTube, Oct. 19, 2021), <https://www.youtube.com/watch?app=desktop&v=oUAFD1tm3Gw>.

299. See *Hunting and Trapping*, MILWAUKEE PUB. MUSEUM, <https://www.mpm.edu/content/wirp/ICW-28> [<https://perma.cc/7GHR-K9VE>].

300. See LAWRIE & LEDWARD, *supra* note 110, at 2.

301. See Velzeboer et al., *supra* note 293, at 2 (finding that meat-eating men “tend to endorse social hierarchies, dominance over nature, and exhibit more Machiavellian traits.” (internal citations omitted)).

302. Rachel Hosie, *Soy Boy: What Does This Online Insult Mean?*, INDEP. (Sep. 30, 2020, at 17:21 EDT), <https://www.the-independent.com/life-style/soy-boy-insult-what-is-definition-far-right-men-masculinity-women-a8027816.html> [<https://perma.cc/F3EX-48XX>] (defining the term “soy boy,” used predominately online, as a “[s]lang used to describe males who completely and utterly lack all necessary masculine qualities. This pathetic state is usually achieved by an over-indulgence of emasculating products and/or ideologies.”).

303. See Daniel Penny, *The Strange History of “Toxic” Masculinity*, GQ (Aug. 16, 2024), <https://www.gq.com/story/the-strange-history-of-toxic-masculinity> [<https://perma.cc/AF2R-RFV7>] (discussing the history of toxic masculinity as a term and its recent history during and after the “me too” movement).

masculinity.³⁰⁴ Specifically, the political right laments and blames a perceived decline in America on the “feminization” of American men and politics.³⁰⁵ In this political climate, reaffirming gender stereotypes has particular salience and meat carries political gravitas. As such, the cultural weight of meat consumption has perhaps never been more of a litmus test.³⁰⁶

V. MEAT IS DEAD: KILLING IT MOVING FORWARD

Americans love to eat meat. As weather patterns change and the cost of farmland goes up, the price of conventional meat is more likely to increase.³⁰⁷ Research indicates that cell-cultivated meat offers the identical nutritional and molecular composition of conventional meat without the moral, public health, or environmental messiness of raising or slaughtering animals.³⁰⁸ One might logically think that Americans would want to have access to as many ways to produce meat as possible. However, this is not true.³⁰⁹

Ultimately, the cell-cultivated meat controversy reflects a broader cultural conflict, highlighting the complex interplay between law, identity, and food. It

304. *Id.*

305. *See, e.g., id.*

306. *See* Jan Dutkiewicz & Gabriel N. Rosenberg, *Why Right-Wingers Are So Afraid of Men Eating Vegetables*, NEW REPUBLIC (Apr. 17, 2023), <https://newrepublic.com/article/171781/meat-culture-war-cricket> [<https://perma.cc/7VGT-HAMT>] (“People once wondered whether an openly gay Republican could ever win major office; today the better question is whether an openly vegan Republican could.”).

307. Karnowski, *supra* note 20 (“Between the drought that hit cattle country hard over the last few years, still being maxed out on the grass available to feed their animals, and with land prices rising, she said, they simply can’t yet make the financial investments that they’d need to raise production.”).

308. Hong et al., *supra* note 282, at 359–60 (noting how cell-based meat may have a lower environmental impact than meat from livestock); *We Are a Nonprofit with a Difference*, GOOD FOOD INST. ASIA PAC., <https://gfi-apac.org/about/> [<https://perma.cc/U24L-WMJC>] (warning that projected conventional meat and seafood consumption will contribute “to historic levels of deforestation, water depletion, and greenhouse gas emissions”); Cookson Beecher, *In a First for Fish, Feds Give Thumbs Up for Lab-Grown Salmon*, FOOD SAFETY NEWS (July 9, 2025, at 00:05 CT), <https://www.foodsafetynews.com/2025/07/in-a-first-for-fish-feds-give-thumbs-up-for-lab-grown-salmon/> [<https://perma.cc/DGX5-R828>] (“Wildtype scientists say the company’s final product has the same amount of healthy omega 3 and omega 6 fatty acids as traditional salmon, while avoiding the risk of mercury, antibiotics and parasite contamination.”). *But see* Amy Quinton, *Lab-Grown Meat’s Carbon Footprint Potentially Worse than Retail Beef*, UC DAVIS (May 22, 2023), <https://www.ucdavis.edu/food/news/lab-grown-meat-carbon-footprint-worse-beef> [<https://perma.cc/T9YK-DJT2>] (“[T]he global warming potential of lab-based meat using these purified media is four to 25 times greater than the average for retail beef.”).

309. *See supra* Part III.C.

matters very much to Americans how their meat is produced—as an animal raised on a farm or as an animal cell reproduced in the lab.³¹⁰ Some Americans find eating animals from large farm settings as disgusting and disturbing as others find the prospect of eating meat grown in a lab. State laws enacting bans on cell-cultured meat indicate that Americans hold dear cultural affinities and identities as expressed through meat from conventional livestock production. These expressive interests are so strong they can run counter to other closely held values such as rugged individualism, small government, and free market capitalism.³¹¹ As such, law must acknowledge that while the debate is live, for many Americans today, meat is still dead.

310. *See, e.g.*, Bamer, *supra* note 226 (“When anybody is talking about meat and it does not come from a live critter, a four-legged critter, it ain’t meat.”).

311. *See id.* (“The Nebraska Farm Bureau supported legislation that would label lab-grown meat but not ban it, saying the bureau supports a free and open market and believes that there is a much better option than a ban.”); Mattox, *supra* note 270 (“Supporters . . . argue[] that it is necessary to protect the . . . cattle industry.”); DeBlasio, *supra* note 237 (“Lab-grown meat bans were never about protecting the people; rather, they represent an authoritarian overreach to control what is on people’s plates and decrease consumer choice.”).