

## Plant-based and Cultivated Meat Diffusion of Innovation: Profiles of U.S. Early Adopter Consumer Segments

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**Keri Szejda, PhD**

Senior Consumer Research Scientist  
The Good Food Institute

**Tessa Urbanovich, MS**

Consumer Research Assistant  
The Good Food Institute

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## Executive Summary

Promoters of either plant-based or cultivated meat will accelerate the purchase of these products with effective segmentation strategies, including targeting those individuals in a population who are most open to innovative products or ideas. The Diffusion of Innovation theory provides insight into the importance of these individuals, also referred to as early adopters. By reaching early adopters first, a product or idea will more quickly spread (or diffuse) through the general consumer population. This study examined the sociodemographic attributes and attitudes of early adopters of either plant-based or cultivated meat. Based on secondary analysis of data from a previous study (Bryant, Szejda, Parekh, Deshpande, & Tse, 2019), we found that these early adopters comprised between 18-33% of the study sample and were generally similar in sociodemographic characteristics to the overall population, including in their dietary habits. We begin by profiling those who report a high willingness to pay more for plant-based or cultivated meat (19% and 18%, respectively), and then next profile the larger percentage of consumers who expressed high purchase intent (33% for plant-based and 30% for cultivated). This second classification may also begin to capture the attitudes and sociodemographic characteristics of the early majority segment. Gaining insight into the early majority is advantageous, as this group's traits begin to reflect those of the remaining general public. Moreover, we examined and reported prominent differences between the two ways of identifying early adopters: those who report a high willingness to pay more for either plant-based or cultivated meat, and those who report high intention to regularly purchase one of these products. These individuals' attitudes toward either product were similar to the overall sample's attitudes, though early adopters held these beliefs much more strongly than did the general public. Plant-based meat early adopters and cultivated meat early adopters hold essentially the same beliefs about the respective products. These findings can guide consumer segmentation to effectively reach those who are most open and willing to purchase these products, thus accelerating the general public's purchasing of plant-based meat and priming for future purchasing of cultivated meat once it becomes available.

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## Table of Contents

<b>Introduction</b>	<b>4</b>
<b>Diffusion of Innovation</b>	<b>4</b>
Table 1. Diffusion of Innovation Categories	4
Figure 1. Adopter categorization on the basis of innovativeness.	5
<b>Early Adopter Segment</b>	<b>5</b>
<b>Method</b>	<b>6</b>
<b>Results</b>	<b>7</b>
<b>Profile of U.S. Plant-based Meat Early Adopters</b>	<b>7</b>
Attitudes toward Plant-based Meat	7
Table 2. Attitudes about Plant-based Meat Products	9
Early Adopters' Preferred Plant-based Meat Products	9
Table 3. Preferred Type of Plant-based Meat	10
Sociodemographic Descriptions of Early Adopters	10
Consumers Who Would Pay More for PBM	10
Consumers Who Would Purchase PBM Regularly	10
Differences between "Purchase Regularly" and "Pay More" groups	11
Sociodemographic Data Tables - Plant-based Meat	11
Table 4. Gender	11
Table 5. Generation	11
Table 6. Race/Ethnicity	12
Table 7. Religion	12
Table 8. Region	13
Table 9. Population Density	13
Table 10. Political Orientation	13
Table 11. Education Levels	14
Table 12. Annual Income Levels	14
Table 13. Diet	15
<b>Profile of U.S. Cultivated Meat Early Adopters</b>	<b>15</b>
Attitudes toward cultivated meat products	15
Table 14. Attitudes about Cultivated Meat Products	17
Early Adopters' Preferred Cultivated Meat Products	18
Table 15. Preferred Types of Cultivated Meat	18
Sociodemographic Description of CM Early Adopters	19
Consumers Who Would Pay More for CM	19
Consumers Who Would Purchase CM Regularly	19
Differences between "pay more" and "purchase regularly" groups	19
Sociodemographic Data Tables - Cultivated Meat	19
Table 16. Gender	19
Table 17. Generation	20
Table 18. Race/Ethnicity	20
Table 19. Religion	21
Table 20. Population Density	21
Table 21. Region	21
Table 22. Political Orientation	22

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Table 23. Education Levels	22
Table 24. Annual Income Levels	23
Table 25. Diet	23
<b>Differences between Plant-based and Cultivated Meat Early Adopters</b>	<b>23</b>
Table 26. Mean Attitudes about Plant-based and Cultivated Meat Products	26
<b>Conclusion</b>	<b>27</b>
<b>Appendix A - Sample and Census Comparison</b>	<b>29</b>
<b>References</b>	<b>30</b>
<b>About the Authors</b>	<b>31</b>
<b>Acknowledgements</b>	<b>31</b>
<b>Suggested Citation</b>	<b>31</b>

# Introduction

Consumer segmentation is a crucial starting point for both scholarly and market research. By identifying populations that are most interested in a specific product, we can study their attitudinal and sociodemographic profiles in order to (a) best understand them, (b) develop products that meet their needs, and (c) target marketing messages toward individuals in this segment (Szejda, Urbanovich, & Wilks, 2019; Szejda, Asher, & Bushnell, 2019). Grounded in the Diffusion of Innovations Theory (DOI; Rogers, 2003), this report provides an attitudinal and sociodemographic profile of the early adopter segment regarding plant-based meat (PBM) and cultivated meat (CM) adoption in the US. Developing early adopter profiles will help tailor marketing and product development efforts (Szejda et al., 2019).

## Diffusion of Innovation

Both plant-based and cultivated meat are innovative products, each at different points in their development and availability to the general population. Diffusion of Innovation Theory categorizes people according to their willingness to adopt an innovation (Rogers, 2003). This theory sheds light on how to examine a population in the context of plant-based and cultivated meat adoption. In accordance with DOI, there are five categories of individuals in a social system with respect to any new innovation. Following a normal distribution (see [Figure 1](#)), each of these categories typically constitutes a specific percentage of the population. As adoption increases over time, each segment will be less or more likely than other groups to adopt an innovation and will be swayed to change by differing tactics.

**Table 1. Diffusion of Innovation Categories**

Segment	Description	Estimated Population Percentage	Successive Market Share
<b>Innovators</b>	Innovators are the first to try a new behavior, product, or idea (and may even be its creators, as the name implies).	2.5%	2.5%
<b>Early Adopters</b>	Early adopters are comprised of people who are comfortable with innovations and are cognizant that change is often inevitable.	13.5%	16%
<b>Early Majority</b>	The early majority need to see evidence of the innovation’s worth prior to their adoption of it.	34%	50%
<b>Late Majority</b>	Late majority individuals are skeptical and more reluctant to embrace change, only adopting an innovation once it becomes the norm in their society.	34%	84%
<b>Laggards</b>	Laggards are bound by tradition and suspicion, and fervently dislike change.	16%	100%

In a 2019 study of plant-based and cultivated meat acceptance, having a trait-level openness to new foods and having prior familiarity with the innovation both significantly and positively predicted participants’ interest in purchasing or paying more for plant-based or cultivated meat products across cultures (Bryant, Szejda, Parekh, Deshpande, & Tse, 2019). In line with DOI, those in the early or late majority may simply have not yet tried plant-based meat, as the majority of individuals within each country (U.S., China, and India) report a lack of familiarity with these new products and a moderate fear of new foods (“food neophobia;” Bryant et al., 2019).

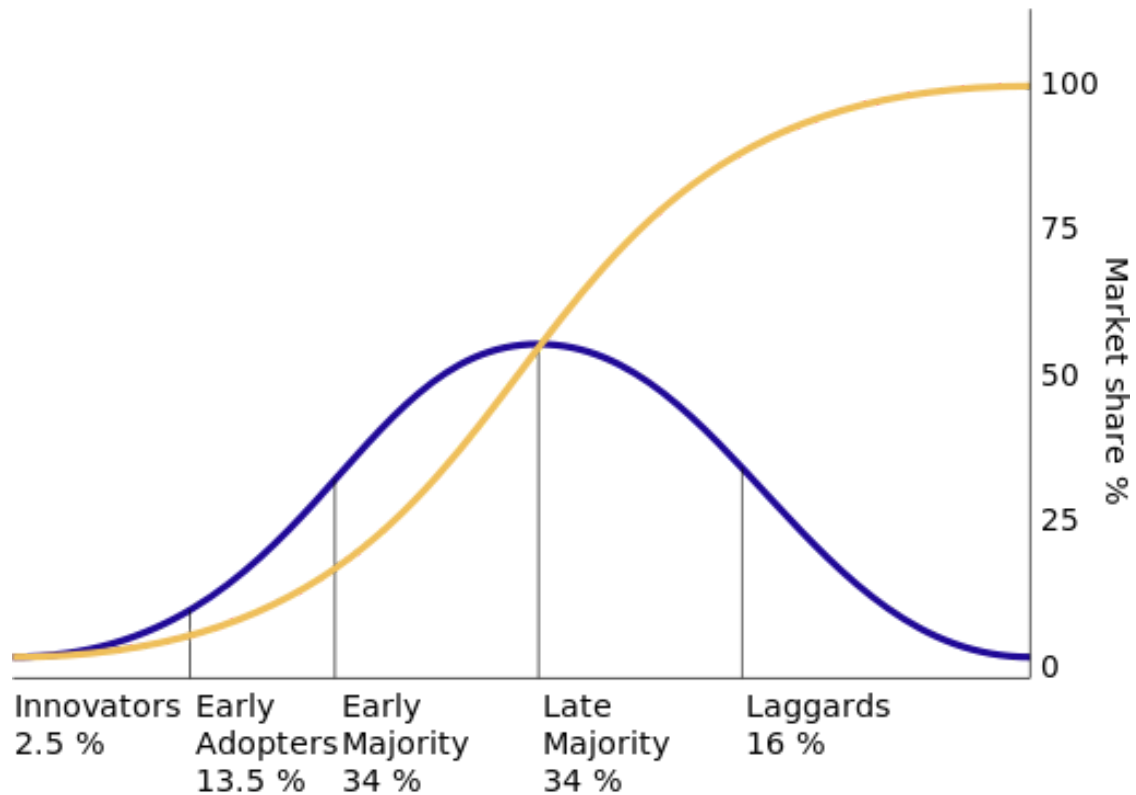


Figure 1. Adopter categorization on the basis of innovativeness.

Source: Wikimedia Commons. Based on Rogers, E. (1962). Diffusion of innovations. London, NY: Free Press.

## Early Adopter Segment

Due to their likelihood of consuming and purchasing plant-based or cultivated meat sooner than the other consumer segments, appealing to early adopters will be most strategic for acceptance of plant-based and cultivated meat. Community members often turn to early adopters for approval of an innovation before they themselves try it (Rogers, 2003). As such, early adopters can act as key assets to the innovation's dissemination and should be targeted in promotional efforts. This report seeks to answer the following research questions:

- RQ<sub>1</sub>: What attitudes toward plant-based meat products does the U.S. early adopter segment hold?
- RQ<sub>2</sub>: In which types of plant-based meat products is the U.S. early adopter segment most interested?
- RQ<sub>3</sub>: What are the sociodemographic characteristics of the plant-based meat U.S. early adopter segment?
- RQ<sub>4</sub>: What are the sociodemographic differences between those who would purchase plant-based meat regularly and those who would pay more for plant-based meat?
- RQ<sub>5</sub>: What attitudes toward cultivated meat products does the U.S. early adopter segment hold?
- RQ<sub>6</sub>: In which types of cultivated meat products is the U.S. early adopter segment most interested?

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- RQ<sub>7</sub>: What are the sociodemographic characteristics of the U.S. cultivated meat early adopter segment?
- RQ<sub>8</sub>: What are the sociodemographic differences between those who would purchase cultivated meat regularly and those who would pay more for cultivated meat?
- RQ<sub>9</sub>: How do the profiles of U.S. plant-based meat early adopters and U.S. cultivated meat early adopters differ?

## Method

In order to identify attitudinal and sociodemographic information about the early adopter segment, the authors conducted secondary analyses of Bryant et al.'s (2019) open access data, available on [Open Science Framework](#), in Bryant et al.'s (2019) study on consumer perceptions of plant-based and cultivated meat. In this paper, we examine the early adopter segment using two indicators: (a) participants who reported being “very or extremely likely” to pay more for plant-based meat or cultivated meat than they would for conventional meat, and (b) participants who reported being “very or extremely likely” to regularly purchase plant-based meat or cultivated meat. Since initial market prices are generally higher than their conventional meat counterparts (Specht, 2019), those who are more likely to pay more for either of the products can be labeled as the true early adopters. However, identification of true early adopters in practice will depend largely on each product's price point. By expanding our examination to include those who are interested in regularly purchasing plant-based or cultivated meat, we begin to tap into the larger early majority segment, the attitudes and demographics of which may differ slightly.

For both the “pay more” and “regularly purchase” groups, we report these individuals' attitudes toward and product type preferences of both plant-based and cultivated meat. Additionally, we conducted descriptive analyses of sociodemographic variables: gender, age, generation, ethnicity, religion, US region, town size, education level, income level, political orientation, dietary identity, and meat consumption levels. This report provides an overview of these findings, with a focus on potential differences between the two early adopter sub-samples and the full sample. Tables for relevant data are included at each section's end in the report.

The first section of the report will examine the attitudes about plant-based meat held by those consumers who indicated a high purchase intent or a high likelihood to pay more for plant-based meat, followed by their preferred types of plant-based meat products. We then review the sociodemographic descriptions of these early adopters and note the differences between the two groups (high purchase intent and willingness to pay more) where appropriate, as well as between the early adopter segment and the study's full sample.

The second section of this report will examine those early adopters who are likely to pay more for cultivated meat or purchase cultivated meat regularly. We again note the differences between each sub-sample and the full sample, as well as differences between the two early adopter groups (those with high purchase intent and those with willingness to pay more for cultivated meat than conventional meat) where applicable.

Our analysis focused on a comparison between the early adopters (as characterized by those willing to pay more or those interested in purchasing regularly) and the full sample. While the full sample was fairly representative of the U.S. population in terms of gender and race, the full sample skewed higher in the 25-44 and 45-64 age groups and lower in the over 65 age group and in Hispanic ethnicity. [Appendix A](#) shows the similarities and differences between the full sample and 2010 U.S. census data. We provide this information as a reference point for understanding the representativeness of the full sample. Interpretation of the profile of early adopters (as reported in the results section) should therefore focus on the differences between the early adopter subgroup and the full sample, and should not be compared to the U.S. census data.

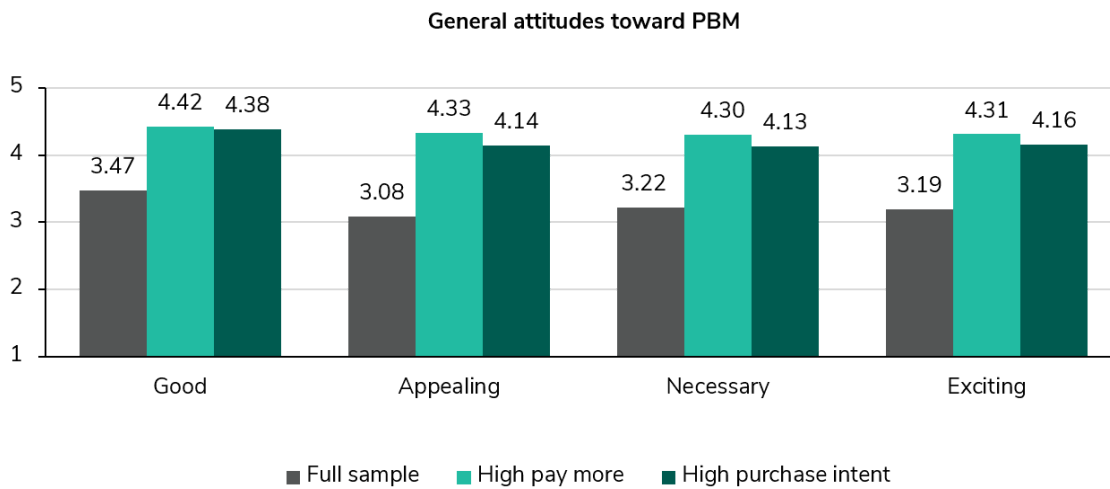
# Results

## Profile of U.S. Plant-based Meat Early Adopters

Overall, 19% of consumers who learn about plant-based meat are 'very likely' or 'extremely likely' to pay more for plant-based meat than conventional meat, while about a third (33%) of consumers who learn about plant-based meat products are 'very likely' or 'extremely likely' to purchase plant-based regularly. In this section, we address the first four research questions, examining the attitudes of early adopters toward plant-based meat (RQ<sub>1</sub>), early adopters' preferred types of plant-based meat (RQ<sub>2</sub>), a sociodemographic description of each group (RQ<sub>3</sub>), and the differences between the "pay more" and the "purchase regularly" early adopter groups (RQ<sub>4</sub>). We will note the differences between the early adopters and the full sample where applicable.

### Attitudes toward Plant-based Meat

In order to answer RQ<sub>1</sub>, we report in Table 1 each group's attitudes toward plant-based meat products, including the early adopters and the full sample. The full sample and both early adopter groups report positive attitudes toward plant-based meat, but the early adopter groups report strong positive attitudes toward each attribute. This indicates that a much larger segment may be open to purchasing by a larger segment as the innovation diffuses through society and prices drop.



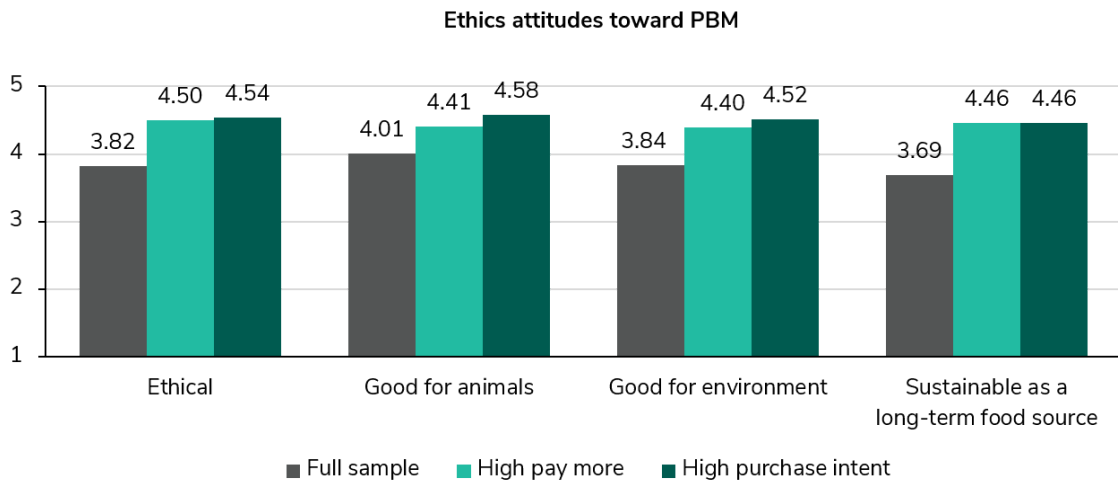
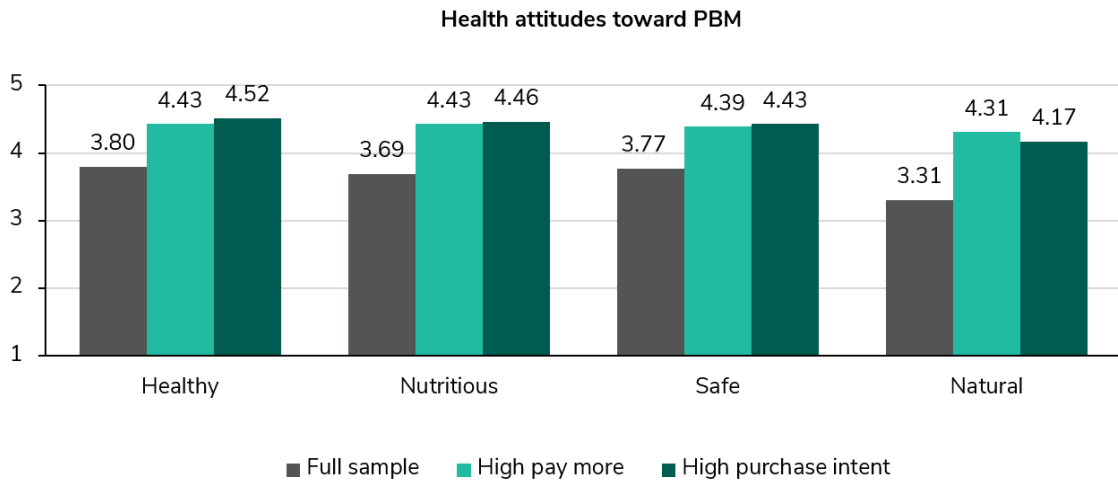
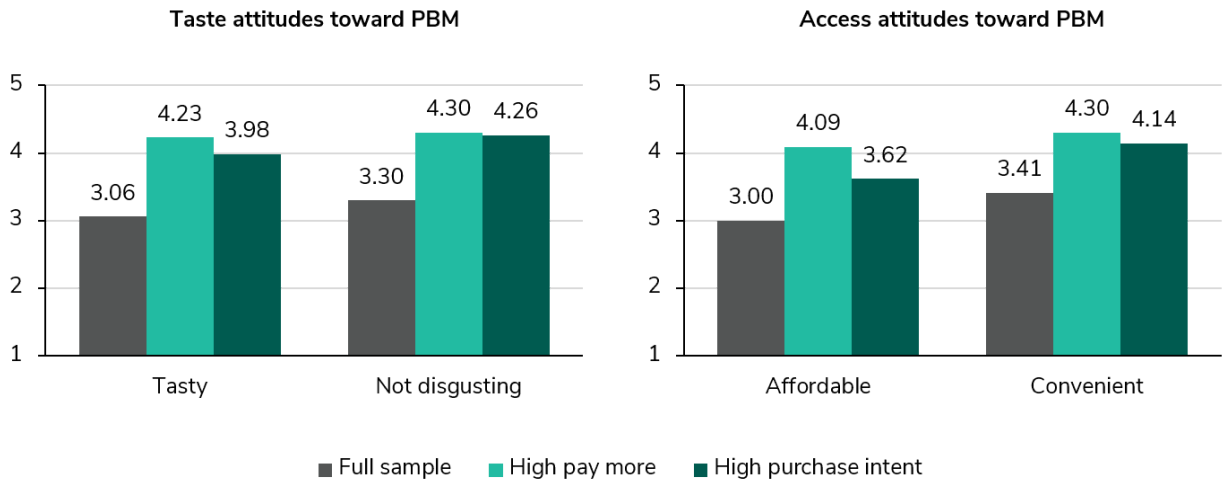




Table 2. Attitudes about Plant-based Meat Products

	Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	M	SD	M	SD	M	SD
Unhealthy/Healthy	3.80	1.14	4.43	.83	4.52	.73
Unnatural/Natural	3.31	1.39	4.31	.93	4.17	1.05
Bad/Good (for environment)	3.84	1.14	4.40	.84	4.52	.76
Unethical/Ethical	3.82	1.20	4.50	.76	4.54	.78
Unappealing/Appealing	3.08	1.37	4.33	.92	4.14	.10
Not tasty/Tasty	3.06	1.26	4.23	.90	3.98	1.00
Unsafe/Safe	3.77	1.13	4.39	.84	4.43	.78
Expensive/Affordable	3.00	1.26	4.09	1.12	3.62	1.31
Bad/Good (for animals)	4.01	1.16	4.41	.88	4.58	.76
Unsustainable/Sustainable (as a long-term food source)	3.69	1.22	4.46	.80	4.46	.79
Inconvenient/Convenient	3.41	1.20	4.30	.89	4.14	.99
Boring/Exciting	3.19	1.30	4.31	.95	4.16	.98
Not nutritious/Nutritious	3.69	1.17	4.43	.78	4.46	.76
Unnecessary/Necessary	3.22	1.27	4.30	.88	4.13	.98
Bad/Good	3.47	1.24	4.42	.84	4.38	.80
Disgusting/Not Disgusting	3.30	1.30	4.30	.97	4.26	.92

Note. Semantic differential items on a 1 to 5 scale were randomly presented to participants. Higher scores indicate attitudes with positive valence.

## Early Adopters' Preferred Plant-based Meat Products

RQ<sub>2</sub> examined early adopters' preferred types of plant-based meat. Overwhelmingly, early adopters (both in the "pay more" and "purchase regularly" groups) are interested in plant-based beef products, while most are also interested in plant-based

poultry and plant-based pork. Fewer early adopters expressed an interest in plant-based mutton and plant-based venison, which is consistent with the sales of their conventional counterparts.

**Table 3. Preferred Type of Plant-based Meat**

	High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	n	%	n	%
<b>Beef</b>	153	83.6%	280	86.2%
<b>Pork</b>	136	74.3%	251	77.2%
<b>Mutton</b>	58	31.7%	94	28.9%
<b>Poultry</b>	139	76.0%	262	80.6%
<b>Fish/Shellfish</b>	90	53.6%	174	53.5%
<b>Venison</b>	35	19.1%	64	19.7%
<b>Horse</b>	13	7.1%	18	5.5%
<b>Dog/Cat</b>	10	5.5%	15	4.6%
<b>Insects</b>	6	3.3%	7	2.2%
<b>Rabbit</b>	17	9.3%	34	10.5%
<b>Other</b>	8	4.4%	20	6.2%

Note. Question was phrased as follows: “Which of the following types of products would be appealing to you if they were produced as plant-based versions? (Please check all that apply)”

## Sociodemographic Descriptions of Early Adopters

RQ<sub>3</sub> sought to examine the social, economic, and demographic characteristics of early adopters in order to provide a description for this segment.

### Consumers Who Would Pay More for PBM

A small set of early adopters (19% of the full sample) report willingness to pay more for plant-based meat than conventional meat. Although this segment is overall very demographically similar to the full sample, more of these individuals are male, Millennials and Hispanic, live in urban areas, identify as politically liberal, and have above average education and income. More individuals who would pay more for plant-based meat live on the West Coast and live in an urban area than do those in the full sample. These individuals are similar to the full sample in that they are mostly omnivores, including light, medium, and heavy meat consumers. There was a slight over-index of heavy meat consumers in the pay more group. Additionally, slightly more of these early adopters have postgraduate degrees than do individuals in the full sample.

### Consumers Who Would Purchase PBM Regularly

About a third (33% of the full sample) reported being likely to purchase plant-based meat regularly. This larger subgroup of early adopters may be able to pull in the early majority. Overall, in terms of gender, age, ethnicity, and religion, these consumers are very similar to the full study sample. However, more Hispanic individuals indicated an interest in purchasing

regularly. Compared to the general U.S. sample, more individuals in the “purchase regularly” group live in the Midwest and on the West Coast, as well as in urban areas or middle-sized towns. Those willing to purchase plant-based meat regularly tend to be more liberal and well-educated than the full sample. This group is also similar to the full U.S. population in terms of meat consumption, in that they are mainly omnivores, including light, medium, and heavy meat consumers. Beyond these small differences, this early adopter group is similar to the full sample of U.S. participants.

**Differences between “Purchase Regularly” and “Pay More” groups**

Lastly, RQ<sub>4</sub> examined the difference between the two early adopter groups. In terms of plant-based meat’s early adopters, we found only slight differences between those who would pay more for plant-based meat and those who intend to purchase it regularly. First, there are slightly more males and Millennials in the “pay more” group than in the “purchase regularly” group. Additionally, more adopters willing to pay more live in urban areas and earn more income than those interested in purchasing plant-based meat regularly. A Chi Square analysis ( $\chi^2(1) = 272.64, p < .001$ ) indicated a strong association between willingness to pay more and intention to purchase regularly. Of the 183 individuals who expressed a willingness to pay more, 85% also indicated they would purchase regularly.

**Sociodemographic Data Tables - Plant-based Meat**

**Table 4. Gender**

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
<b>Gender</b>	Male	471	47.7%	101	55.2%	162	49.8%
	Female	507	51.4%	81	44.3%	162	49.8%
	Other	9	0.9%	1	0.5%	1	0.3%

**Table 5. Generation**

Age in 2018		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
<b>Generation</b>	Generation Z (under 22)	54	5.5%	6	3.3%	18	5.5%
	Millennials (22-36)	381	38.6%	92	50.3%	140	43.1%
	Generation X (37-53)	389	39.4%	61	33.3%	124	38.2%
	Baby boomers (54-72)	163	16.5%	24	13.1%	43	13.2%

Table 6. Race/Ethnicity

	Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	n	%	n	%	n	%
Hispanic, Latino, or Spanish	77	7.8%	24	13.1%	36	11.1%
White or Caucasian	746	75.6%	122	66.7%	242	74.5%
Black or African American	118	12.0%	28	15.3%	34	10.5%
American Indian or Alaskan Native	22	2.2%	3	1.6%	6	1.8%
Asian (including South Asian)	5	5.8%	9	4.9%	16	4.9%
Middle Eastern or North African	52	0.1%	0	0	0	0
Native Hawaiian or Other Pacific Islander	1	0.1%	0	0	1	0.3%
Other		0.6%	1	0.5%	0	0
Prefer not to say		0.4%	2	1.1%	2	0.6%

Table 7. Religion

	Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	n	%	n	%	n	%
Hinduism	6	0.6%	2	1.1%	3	0.9%
Islam	17	1.7%	2	1.1%	5	1.5%
Christianity	649	65.8%	123	67.2%	214	65.8%
Sikhism	0	0.0%	0	0	0	0
Buddhism	12	1.2%	5	2.7%	5	1.5%
Jainism	1	0.1%	1	0.5%	1	0.3%
Judaism	15	1.5%	5	2.7%	5	1.5%

<b>Taoism</b>	1	0.1%	0	0	0	0
<b>Confucianism</b>	2	0.2%	0	0	0	0
<b>Other religion</b>	100	10.1%	11	6.0%	25	7.7%
<b>Agnostic / Atheist Spiritual / Not religious</b>	184	18.6%	34	18.6%	67	20.6%

Table 8. Region

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
<b>Northeast</b>		184	18.6%	39	21.3%	65	20.0%
<b>Midwest</b>		228	23.1%	28	15.3%	59	18.2%
<b>South</b>		373	37.8%	63	34.4%	116	35.7%
<b>West</b>		202	20.5%	53	29.0%	85	26.2%

Table 9. Population Density

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
<b>Location</b>	Rural area or village	181	18.5%	24	13.1%	52	16.0%
	Small or middle-sized town	373	38.1%	47	25.7%	104	32.0%
	Large town or city	424	43.4%	111	60.7%	169	52.0%

Table 10. Political Orientation

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
<b>Political orientation</b>	Very liberal	95	9.6%	25	13.7%	44	13.5%

	Liberal	169	17.1%	34	18.6%	79	24.3%
	Moderate	417	42.2%	77	42.1%	128	39.4%
	Conservative	208	21.1%	28	15.3%	49	15.1%
	Very conservative	98	9.9%	19	10.4%	25	7.7%

Table 11. Education Levels

	Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	n	%	n	%	n	%
No education	1	0.1%	0	0	0	0
Primary school	2	0.2%	0	0	1	0.3%
Some high school	25	2.5%	4	2.2%	8	2.5%
Completed high school	297	30.1%	41	22.4%	78	24.0%
Technical qualification or trade certificate	151	15.3%	29	15.8%	49	15.1%
College/Undergraduate degree	376	38.1%	70	38.3%	127	39.1%
Postgraduate degree	135	13.7%	39	21.3%	62	19.1%

Table 12. Annual Income Levels

	Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
	n	%	n	%	n	%
Less than \$20,000	141	14.3%	19	10.4%	38	11.7%
\$20,000 to \$39,999	215	21.8%	28	15.3%	63	19.4%
\$40,000 to \$59,999	191	19.4%	24	13.1%	52	16.0%
\$60,000 to \$79,999	159	16.1%	33	18.0%	57	17.5%
\$80,000 to \$99,999	111	11.2%	34	18.6%	47	14.5%
\$100,000 or more	170	17.2%	45	24.6%	68	20.9%

Table 13. Diet

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
		n	%	n	%	n	%
Diet	Vegan	12	1.2%	4	2.2%	4	1.2%
	Vegetarian	17	1.7%	7	3.8%	7	2.2%
	Pescatarian	17	1.7%	5	2.7%	10	3.1%
	Omnivore	941	95.3%	167	91.3%	304	93.5%
Meat consumption frequency	None	21	2.1%	10	5.5%	10	3.1%
	Light	139	14.1%	19	10.4%	41	12.6%
	Medium	493	49.9%	82	44.8%	163	50.2%
	Heavy	334	33.8%	72	39.3%	111	34.2%

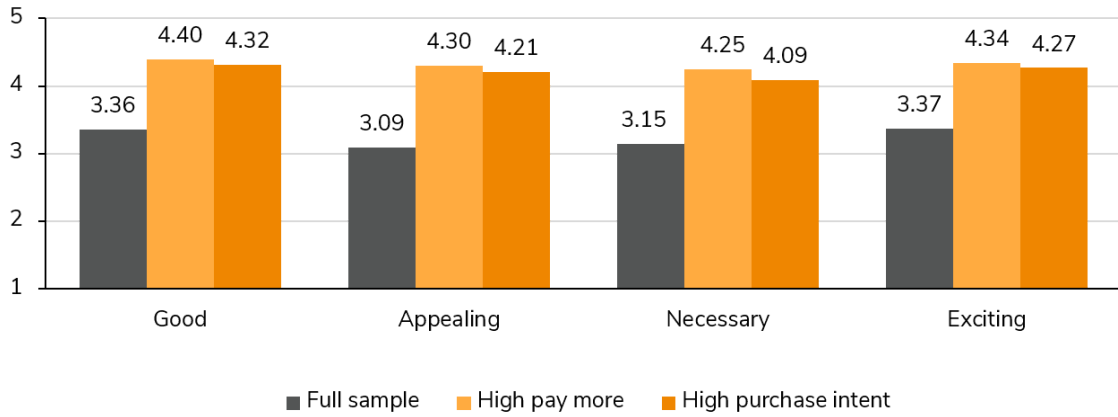
## Profile of U.S. Cultivated Meat Early Adopters

Similar to plant-based meat early adopters, those who would pay more for cultivated meat than conventional meat constitute about 18% of the population, while those who express interest in purchasing cultivated meat regularly (after learning about it) make up about 30% of the population. In this section, we address the four research questions related to cultivated meat, examining the attitudes of early adopters toward cultivated meat (RQ<sub>5</sub>), early adopters' preferred types of cultivated meat (RQ<sub>6</sub>), a sociodemographic description of each group (RQ<sub>7</sub>), and the differences between the “pay more” and the “purchase regularly” early adopter groups (RQ<sub>8</sub>). We will note the differences between the early adopters and the full sample where applicable.

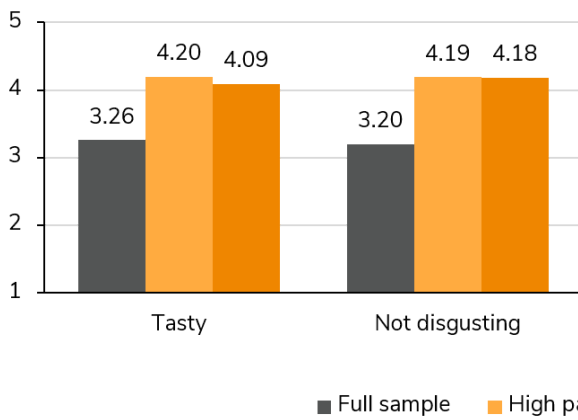
### Attitudes toward cultivated meat products

RQ<sub>5</sub> examined early adopters' attitudes toward cultivated meat. Overall, the top belief about cultivated meat for both the entire sample and early adopters is that the product is good for animals. More specifically, early adopters hold strong beliefs that cultivated meat is also good for the environment, ethical, sustainable, and good overall. In comparison, the entire sample also believe cultivated meat to be good for the environment, sustainable, ethical and nutritious, though these beliefs were not as strong as those of the “pay more” or “purchase regularly” groups. However, naturalness and price concerns were higher in the full sample. Similar to plant-based meat, these overall neutral to positive beliefs among the full sample indicate that a much larger segment may be open to purchasing as the innovation diffuses through society and prices drop.

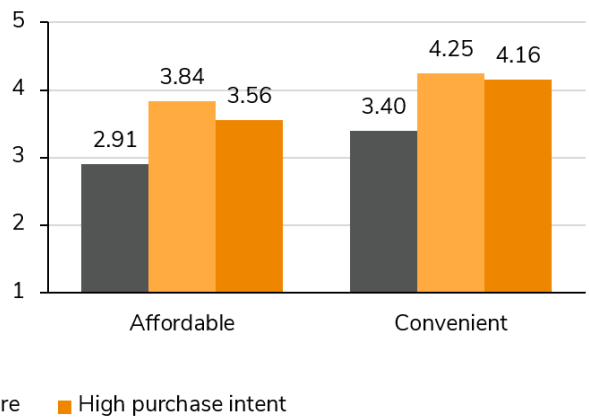
General attitudes toward CM



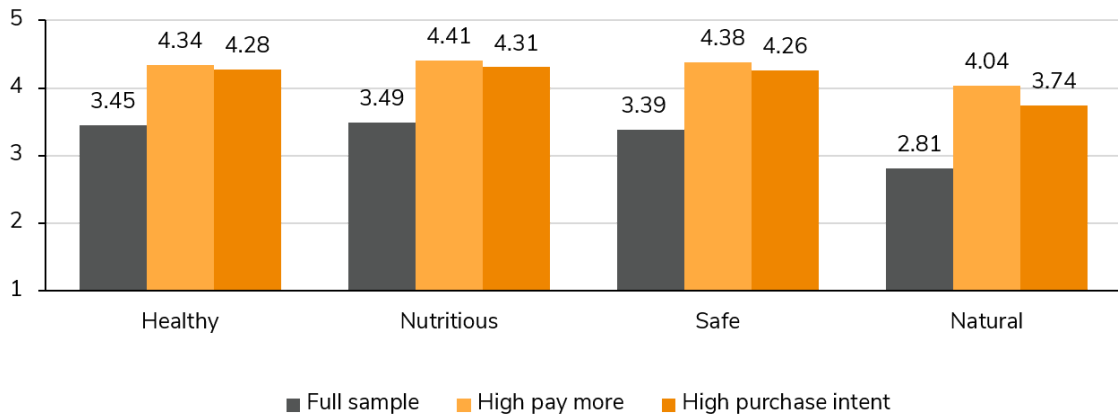
Taste attitudes toward CM



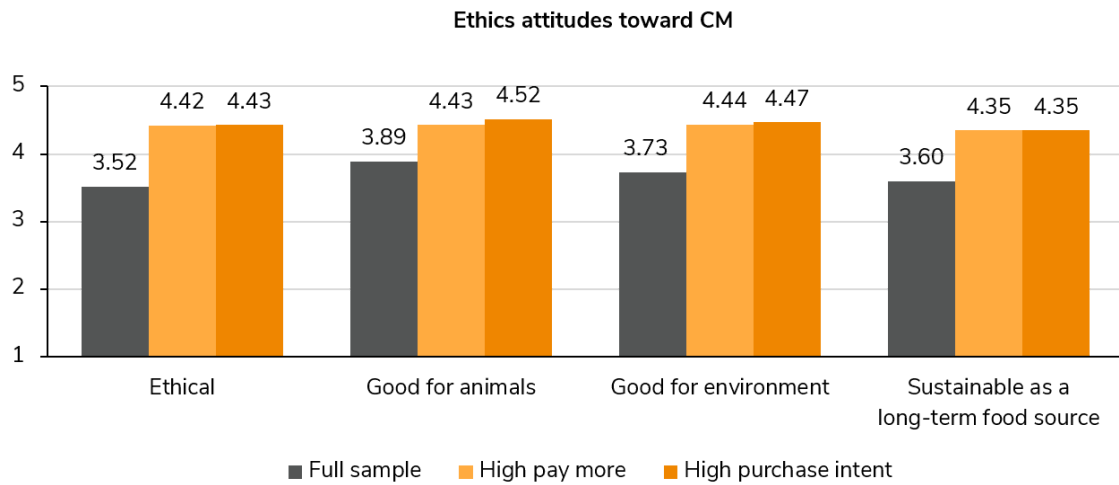
Access attitudes toward CM



Health attitudes toward CM







**Table 14. Attitudes about Cultivated Meat Products**

	Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
	M	SD	M	SD	M	SD
Unhealthy/Healthy	3.45	1.18	4.34	.91	4.28	.90
Unnatural/Natural	2.81	1.45	4.04	1.24	3.74	1.35
Bad/Good (for environment)	3.73	1.15	4.44	.89	4.47	.83
Unethical/Ethical	3.52	1.28	4.42	.85	4.43	.83
Unappealing/Appealing	3.09	1.36	4.30	.94	4.21	.95
Not tasty/Tasty	3.26	1.16	4.20	.96	4.09	.99
Unsafe/Safe	3.39	1.22	4.38	.90	4.26	.92
Expensive/Affordable	2.91	1.26	3.84	1.23	3.56	1.30
Bad/Good (for animals)	3.89	1.18	4.43	.86	4.52	.85
Unsustainable/Sustainable (as a long-term food source)	3.60	1.21	4.35	.99	4.35	.97

Inconvenient/Convenient	3.40	1.22	4.25	.95	4.16	1.00
Boring/Exciting	3.37	1.18	4.34	.86	4.27	.87
Not nutritious/Nutritious	3.49	1.16	4.41	.85	4.31	.87
Unnecessary/Necessary	3.15	1.30	4.25	.94	4.09	.98
Bad/Good	3.36	1.25	4.40	.91	4.32	.89
Disgusting/Not Disgusting	3.20	1.30	4.19	1.03	4.18	.97

Note. Semantic differential items were randomly presented to participants. Higher scores indicate attitudes with positive valence.

## Early Adopters' Preferred Cultivated Meat Products

RQ<sub>6</sub> sought to answer which types of cultivated meat products are preferred by early adopters of cultivated meat. Individuals in this segment are most interested in cultivated beef, pork, poultry, and fish/shellfish. Also of interest was cultivated mutton and venison. There was less interest in species with less common conventional counterparts.

Table 15. Preferred Types of Cultivated Meat

	High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
	n	%	n	%
Beef	148	84.6%	269	91.5%
Pork	136	77.7%	246	83.7%
Mutton	72	41.1%	98	33.3%
Poultry	129	73.7%	239	81.3%
Fish/Shellfish	88	50.3%	160	54.4%
Venison	34	19.4%	65	22.1%
Horse	13	7.4%	20	6.8%
Dog/Cat	16	9.1%	15	5.1%
Insects	9	5.1%	10	3.4%
Rabbit	19	10.9%	36	12.2%
Other	6	3.4%	14	4.8%

Note. Question was phrased as follows: "Which of the following types of products would be appealing to you if they were produced as cultivated versions? (Please check all that apply)"

# Sociodemographic Description of CM Early Adopters

## Consumers Who Would Pay More for CM

Some early adopters (18% of the full sample) reported willingness to pay more for cultivated meat than conventional meat. While this segment is overall very similar to the study’s U.S. sample, we will address RQ<sub>7</sub>, by describing how this subgroup differs from the full sample. In comparison with the sample, the “pay more” group has a higher percentage of males, Generation Z and Millennials, slightly fewer white individuals, slightly more black/African American individuals, more urban dwellers, and more people who identify as politically liberal. People in this group also tend to have higher income and postgraduate degrees than do those in the full sample. Overall, the “pay more” group is similar to the full sample in terms of meat consumption, in that they are predominantly omnivores. However, in comparison to the full sample, heavy meat eaters more frequently expressed a high willingness to pay more for cultivated meat.

## Consumers Who Would Purchase CM Regularly

Those early adopters who would purchase cultivated meat regularly (30% of the total sample) provide insight into both the early adopter and the early majority groups. These individuals are also overall very similar to the study sample. They differ from the U.S. sample in that there are slightly more Generation Z and Millennials in this group, as well as those who live in urban areas and identify as politically liberal. This group was similar to the full sample in terms of education, income, and meat consumption.

## Differences between “pay more” and “purchase regularly” groups

Lastly, RQ<sub>8</sub> examined the difference between the two cultivated meat early adopter groups, in which we identified only slight differences. The “pay more” group has a greater proportion of males and urban dwellers than those who would purchase cultivated meat regularly. There are also slightly higher percentages of Millennials and heavy meat consumers who would pay more than purchase regularly. A Chi Square analysis ( $\chi^2(1) = 268.24, p < .001$ ) indicated a strong association between willingness to pay more and intention to purchase regularly. Of the 175 individuals who expressed a willingness to pay more, 81% also indicated they would purchase regularly.

## Sociodemographic Data Tables - Cultivated Meat

Table 16. Gender

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%
Gender	Male	471	47.7%	103	58.9%	156	53.1%
	Female	507	51.4%	72	41.1%	138	46.9%
	Other	9	0.9%	0	0	0	0

Table 17. Generation

		Full Sample N = 987		High Pay More Early Adopters N = 183		High Purchase Intent Early Adopters N = 325	
Age in 2018		n	%	n	%	n	%
<b>Generation</b>	Generation Z (under 22)	54	5.5%	14	8.0%	19	6.5%
	Millennials (22-36)	381	38.6%	85	48.6%	124	42.2%
	Generation X (37-53)	389	39.4%	57	32.6%	113	38.4%
	Baby boomers (54-72)	163	16.5%	19	10.9%	38	12.9%

Table 18. Race/Ethnicity

	Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
	n	%	n	%	n	%
<b>Hispanic, Latino, or Spanish</b>	77	7.8%	19	10.9%	23	7.8%
<b>White or Caucasian</b>	746	75.6%	117	66.9%	219	74.5%
<b>Black or African American</b>	118	12.0%	30	17.1%	41	13.9%
<b>American Indian or Alaskan Native</b>	22	2.2%	0	0	7	2.4%
<b>South Asian (Indian Subcontinent)</b>	5	0.5%	1	0.6%	1	0.3%
<b>Asian</b>	52	5.3%	8	4.6%	12	4.1%
<b>Middle Eastern or North African</b>	1	0.1%	0	0	0	0
<b>Native Hawaiian or Other Pacific Islander</b>	1	0.1%	0	0	1	0.3%
<b>Other</b>	6	0.6%	1	0.6%	0	0
<b>Prefer not to say</b>	4	0.4%	2	1.1%	1	0.3%

Table 19. Religion

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%
Hinduism		6	0.6%	3	1.7%	2	0.7%
Islam		17	1.7%	3	1.7%	4	1.4%
Christianity		649	65.8%	117	66.9%	195	66.3%
Sikhism		0	0.0%	0	0	0	0
Buddhism		12	1.2%	4	2.3%	3	1.0%
Jainism		1	0.1%	0	0	0	0
Judaism		15	1.5%	5	2.9%	6	2.0%
Taoism		1	0.1%	0	0	0	0
Confucianism		2	0.2%	0	0	0	0
Other religion		100	10.1%	17	9.7%	29	9.9%
Agnostic / Atheist Spiritual / Not religious		184	18.6%	26	14.9%	55	18.7%

Table 20. Population Density

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%
Location	Rural area or village	181	18.5%	24	13.7%	53	18.0%
	Small or middle-sized town	373	38.1%	45	25.7%	96	32.7%
	Large town or city	424	43.4%	105	60.0%	145	49.3%

Table 21. Region

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%

<b>Northeast</b>	184	18.6%	35	20.0%	55	18.7%
<b>Midwest</b>	228	23.1%	30	17.1%	61	20.7%
<b>South</b>	373	37.8%	69	39.4%	119	40.5%
<b>West</b>	202	20.5%	41	23.4%	59	20.1%

Table 22. Political Orientation

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%
<b>Political orientation</b>	Very liberal	95	9.6%	27	15.4%	39	13.3%
	Liberal	169	17.1%	36	20.6%	65	22.1%
	Moderate	417	42.2%	70	40.0%	122	41.5%
	Conservative	208	21.1%	25	14.3%	43	14.6%
	Very conservative	98	9.9%	17	9.7%	25	8.5%

Table 23. Education Levels

	Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
	n	%	n	%	n	%
<b>No education</b>	1	0.1%	0	0	0	0
<b>Primary school</b>	2	0.2%	1	0.6%	0	0
<b>Some high school</b>	25	2.5%	3	1.7%	6	2.0%
<b>Completed high school</b>	297	30.1%	41	23.4%	86	29.3%
<b>Technical qualification or trade certificate</b>	151	15.3%	27	15.4%	46	15.6%
<b>College/Undergraduate degree</b>	376	38.1%	63	36.0%	102	34.7%
<b>Postgraduate degree</b>	135	13.7%	40	22.9%	53	18.0%

Table 24. Annual Income Levels

	Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
	n	%	n	%	n	%
Less than \$20,000	141	14.3%	18	10.3%	44	15.0%
\$20,000 to \$39,999	215	21.8%	31	17.7%	61	20.7%
\$40,000 to \$59,999	191	19.4%	29	16.6%	52	17.7%
\$60,000 to \$79,999	159	16.1%	27	15.4%	44	15.0%
\$80,000 to \$99,999	111	11.2%	26	14.9%	30	10.2%
\$100,000 or more	170	17.2%	44	25.1%	63	21.4%

Table 25. Diet

		Full Sample N = 987		High Pay More Early Adopters N = 175		High Purchase Intent Early Adopters N = 294	
		n	%	n	%	n	%
<b>Diet</b>	Vegan	12	1.2%	1	0.6%	1	0.3%
	Vegetarian	17	1.7%	3	1.7%	2	0.7%
	Pescatarian	17	1.7%	2	1.1%	4	1.4%
	Omnivore	941	95.3%	169	96.6%	287	97.6%
<b>Meat consumption frequency</b>	None	21	2.1%	2	1.1%	2	0.7%
	Light	139	14.1%	21	12.0%	31	10.5%
	Medium	493	49.9%	76	43.4%	148	50.3%
	Heavy	334	33.8%	76	43.4%	113	38.4%

## Differences between Plant-based and Cultivated Meat Early Adopters

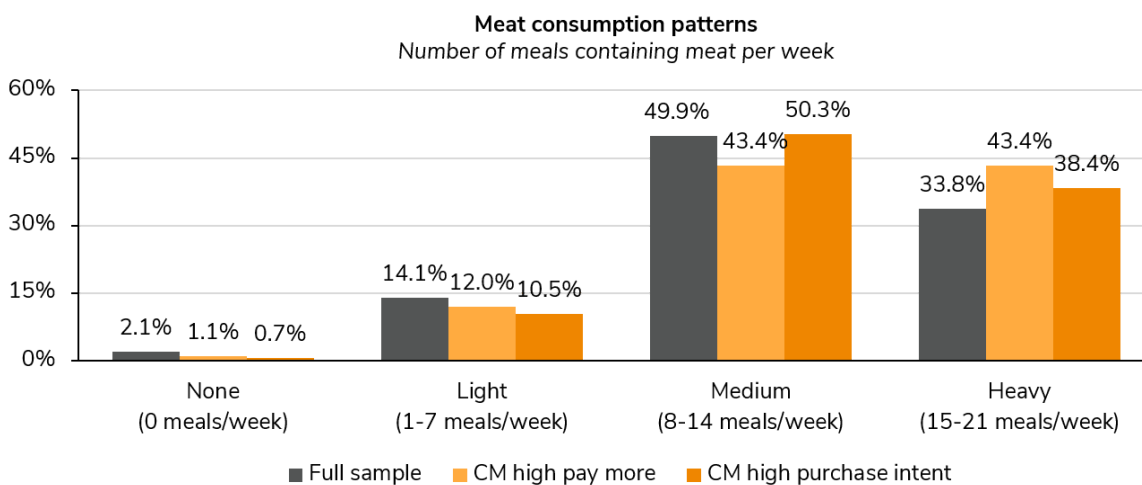
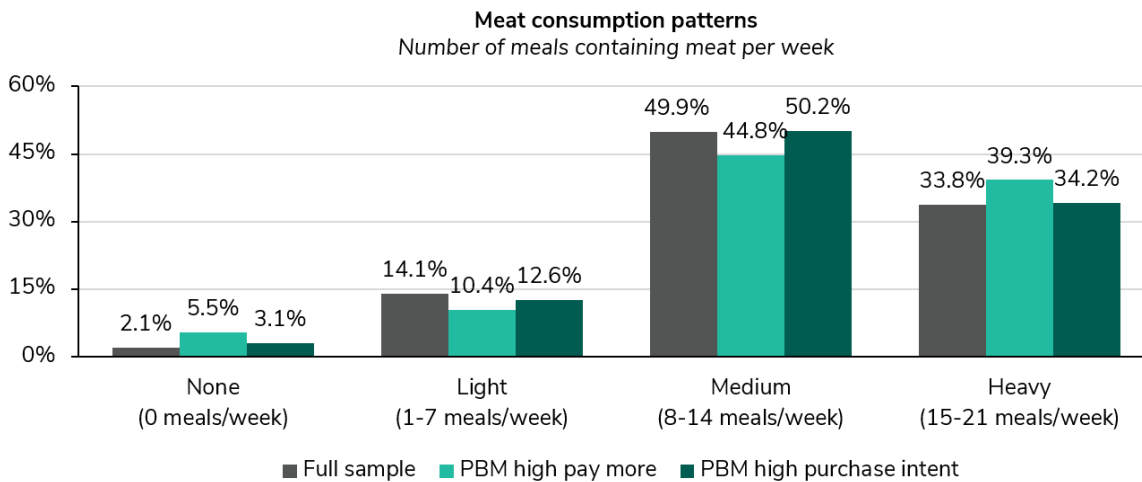
RQ<sub>9</sub> more generally asks whether the early adopters of plant-based meat and the early adopters of cultivated meat are the same individuals. If not, how do the two groups differ in their motivations and attitudes? To examine the first part of RQ<sub>9</sub>, we conducted a Chi Square analysis. For the second part, we compared the attitudinal data from RQ<sub>1</sub> and RQ<sub>5</sub>.

We first looked at the overlap between both products' early adopters in terms of willingness to pay more. Results from a Chi Square analysis ( $\chi^2(1) = 352.53, p < .001$ ) indicate that 66% of the 183 plant-based meat early adopters are also cultivated

meat early adopters. Of the 175 individuals interested in cultivated meat, 69% are also interested in plant-based meat. While there was a significant association between willingness to pay a higher price for plant-based meat and willingness to pay a higher price for cultivated meat, about 1/3 of the early adopters did not overlap across the two meat types. These results suggest that there is a market for both plant-based and cultivated meat as a sizeable (1/3) percentage of each early adopter group has indicated interest in one alternative protein but not the other.

We then ran the same above analysis for those interested in purchasing either plant-based or cultivated meat regularly ( $\chi^2(1) = 242.71, p < .001$ ). The data indicated similar results: 62% of the 325 plant-based meat early adopters are also cultivated meat early adopters and 69% of the 294 cultivated early adopters meat are plant-based meat early adopters.

Compared to the full sample, early adopters with willingness to pay more reported higher frequency of meat consumption. Heavy meat eaters (those who eat meals containing meat 15-21 times per week) more frequently expressed a high willingness to pay more for both plant-based and cultivated meat. This difference was more dramatic for cultivated meat, and heavy meat eaters more frequently expressed high purchase intent for cultivated meat as well.

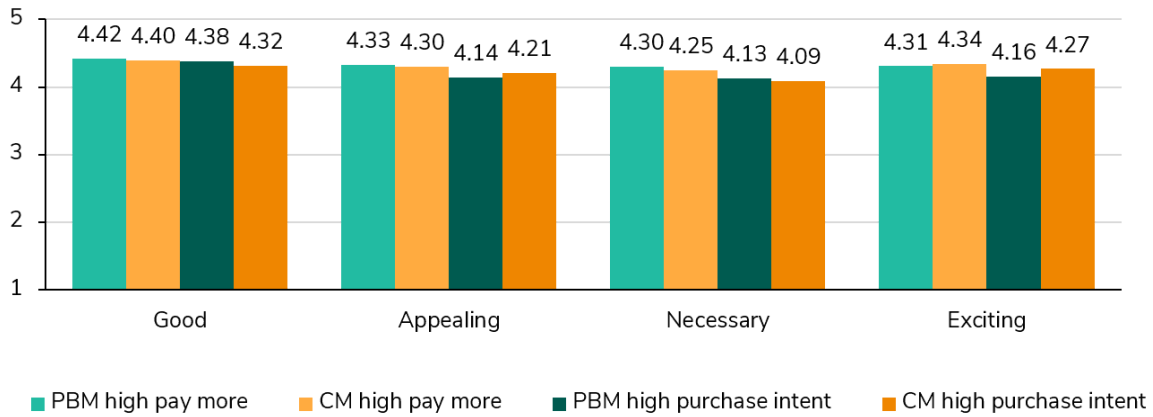




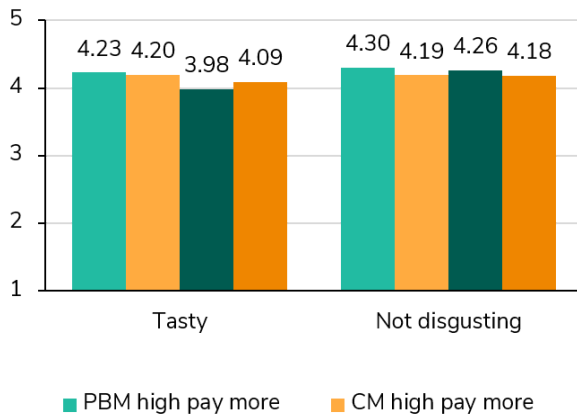
Early adopters with willingness to pay more for either product hold similar beliefs about product attributes. Both groups perceive their respective product as ethical, environmentally friendly, nutritious, and overall good. These groups' beliefs did not differ greatly, as evident in the reported means in Table 26.

In general, these findings showed that all consumers positively perceive plant-based meat and cultivated meat in regard to animal welfare, ethics, sustainability, and health. However, as noted in RQ<sub>1</sub> and RQ<sub>5</sub>, these attitudes were stronger for early adopters of either product than the entire sample's beliefs. Overall, early adopters perceive these benefits of either product.

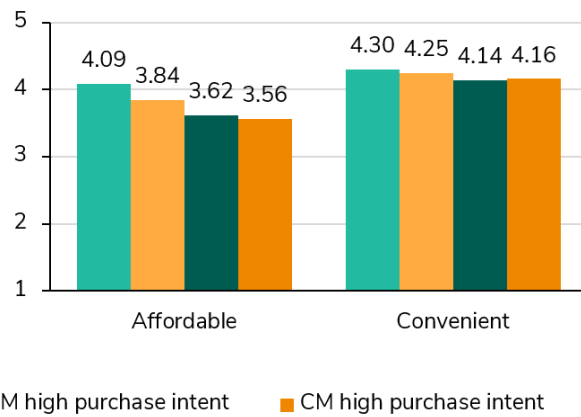
**General attitudes toward PBM and CM**



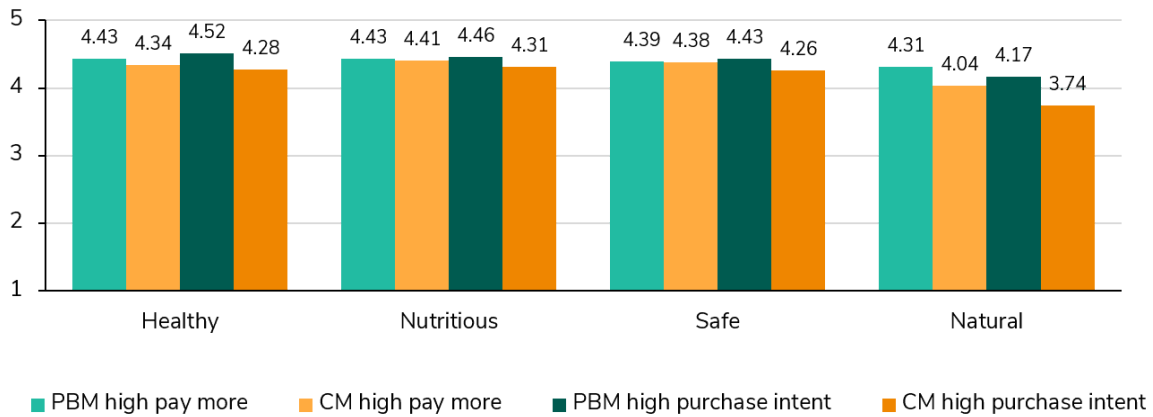
**Taste attitudes toward PBM and CM**



**Access attitudes toward PBM and CM**



Health attitudes toward PBM and CM



Ethics attitudes toward PBM and CM

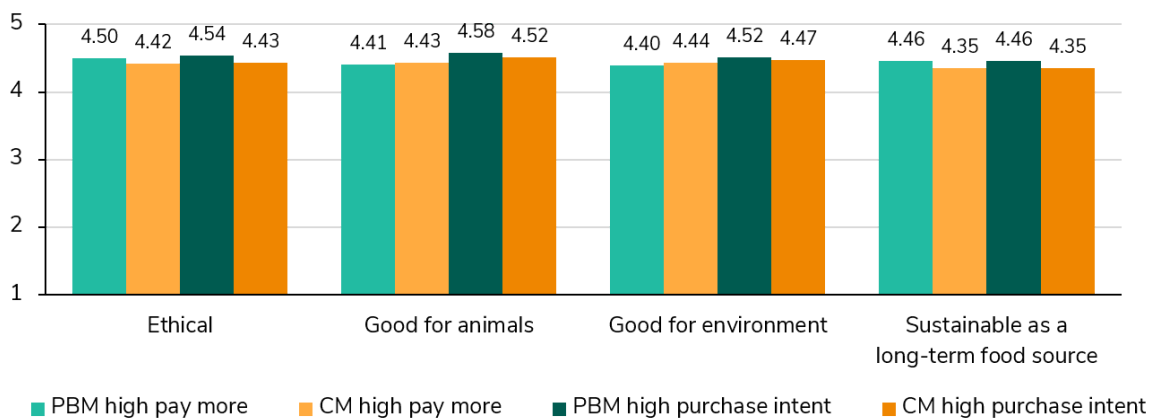


Table 26. Mean Attitudes about Plant-based and Cultivated Meat Products

PBM or CM Product Attitudes	Full Sample		High Pay More		High Purchase Intent	
	Full Sample Plant-based N = 987	Full Sample Cultivated N = 987	Plant-based Early Adopters N = 183	Cultivated Early Adopters N = 175	Plant-based Early Adopters N = 325	Cultivated Early Adopters N = 294
Unhealthy/Healthy	3.80	3.45	4.43	4.34	4.52	4.28
Unnatural/Natural	3.31	2.81	4.31	4.04	4.17	3.74
Bad/Good (for environment)	3.84	3.73	4.40	4.44	4.52	4.47

<b>Unethical/Ethical</b>	3.82	3.52	4.50	4.42	4.54	4.43
<b>Unappealing/ Appealing</b>	3.08	3.09	4.33	4.30	4.14	4.21
<b>Not tasty/Tasty</b>	3.06	3.26	4.23	4.20	3.98	4.09
<b>Unsafe/Safe</b>	3.77	3.39	4.39	4.38	4.43	4.26
<b>Expensive/Affordable</b>	3.00	2.91	4.09	3.84	3.62	3.56
<b>Bad/Good (for animals)</b>	4.01	3.89	4.41	4.43	4.58	4.52
<b>Unsustainable/ Sustainable (as a long-term food source)</b>	3.69	3.60	4.46	4.35	4.46	4.35
<b>Inconvenient/ Convenient</b>	3.41	3.40	4.30	4.25	4.14	4.16
<b>Boring/Exciting</b>	3.19	3.37	4.31	4.34	4.16	4.27
<b>Not nutritious/ Nutritious</b>	3.69	3.49	4.43	4.41	4.46	4.31
<b>Unnecessary/Necessary</b>	3.22	3.15	4.30	4.25	4.13	4.09
<b>Bad/Good</b>	3.47	3.36	4.42	4.40	4.38	4.32
<b>Disgusting/Not Disgusting</b>	3.30	3.20	4.30	4.19	4.26	4.18

Note. Semantic differential items were randomly presented to participants. Higher scores indicate attitudes with positive valence.

## Conclusion

Our analysis identifies the percentage of U.S. consumers who constitute early adopters of plant-based and cultivated meat, as well as their attitudes, meat-type preferences, and demographic information. These early adopters generally share the same beliefs about plant-based and cultivated meat with the full sample. However, the early adopter segments' positive attitudes are more pronounced.

Additionally, early adopters and the full sample tend to prefer the same types of meat whether they are plant-based or cultivated meat and prefer types that are familiar (e.g., beef, pork, and poultry). Early adopters report low interest in less familiar origin types, including venison, horse meat, rabbit meat, insects, and dog or cat meat.

About one third of the population would purchase plant-based meat (33%) and cultivated meat (30%) regularly, while about one in five reported to be willing to pay more for plant-based meat (19%) and cultivated meat (18%). Compared to the study sample, these early adopters are more often male, politically liberal, Millennial, urban, well-educated, and heavy meat consumers. Overall, early adopters of both products perceive the products as having positive personal and altruistic benefits.

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While there is overlap between the plant-based early adopter group and the cultivated early adopter group, about ⅓ of each group does not overlap with the other group. These results suggest that there is a market for both plant-based and cultivated meat as a sizeable (1/3) percentage of each early adopter group has indicated interest in one alternative protein but not the other.

Promotion of any product is more effective when it targets a consumer segment. However, this is especially true when targeting segments that have greater openness to adopt a novel innovation, such as plant-based and cultivated meat. By using the attitudinal, product-type, and sociodemographic data presented here, marketing efforts can be targeted to early adopters, thus accelerating the rate of market adoption.

## Appendix A - Sample and Census Comparison

		Full Sample N = 987		U.S. Census (2010)
		n	%	%
<b>Gender</b>	Male	471	47.7%	49.2%
	Female	507	51.4%	50.8%
	Other	9	0.9%	N/A
<b>Age</b>	18 - 24 years old	95	9.6%	9.9%
	25 - 44 years old	534	54.1%	26.6%
	45 - 64 years old	346	35.1%	26.4%
	65 years or older	12	1.2%	13%
<b>Race/Ethnicity</b>	Hispanic, Latino, or Spanish	77	7.8%	16.3%
	White or Caucasian	746	75.6%	74.8%
	Black or African American	118	12.0%	13.6%
	American Indian or Alaskan Native	22	2.2%	1.7%
	South Asian (Indian Subcontinent)	5	0.5%	N/A
	Asian	52	5.3%	5.6%
	Middle Eastern or North African	1	0.1%	N/A
	Native Hawaiian or Other Pacific Islander	1	0.1%	0.4%
	Other	6	0.6%	N/A
	Prefer not to say	4	0.4%	N/A

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# About the Authors

## Keri Szejda, PhD

Senior Consumer Research Scientist, The Good Food Institute

[✉ email keris@gfi.org](mailto:keris@gfi.org) [in Keri at LinkedIn](#)

Keri's research advances the plant-based and cultivated meat market sectors by generating effective messaging that helps consumers make healthy, sustainable, and just food choices. She is also visiting scholar with the School of Social and Behavioral Sciences at Arizona State University (ASU). Keri earned her Ph.D. in Communication from ASU's Hugh Downs School of Human Communication and completed postdoctoral work in science communication with ASU's School for the Future of Innovation in Society.

## Tessa Urbanovich, MS

Consumer Research Assistant, The Good Food Institute

[✉ email tessau@gfi.org](mailto:tessau@gfi.org) [in Tessa at LinkedIn](#)

Tessa earned her M.S. in health and strategic communication at Chapman University in Southern California. With experience in the animal welfare and plant-based sectors, she previously volunteered as consumer research fellow with GFI. Tessa brings her social science research skills to support GFI's research on effective consumer messaging to promote both plant-based meat and cultivated meat.

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## About GFI

The Good Food Institute is a global nonprofit building a sustainable, healthy, and just food system. With expertise across the scientific, regulatory, industry, and investment landscape, we are accelerating the transition of the world's food system to alternative proteins, using the power of food innovation and markets.

