

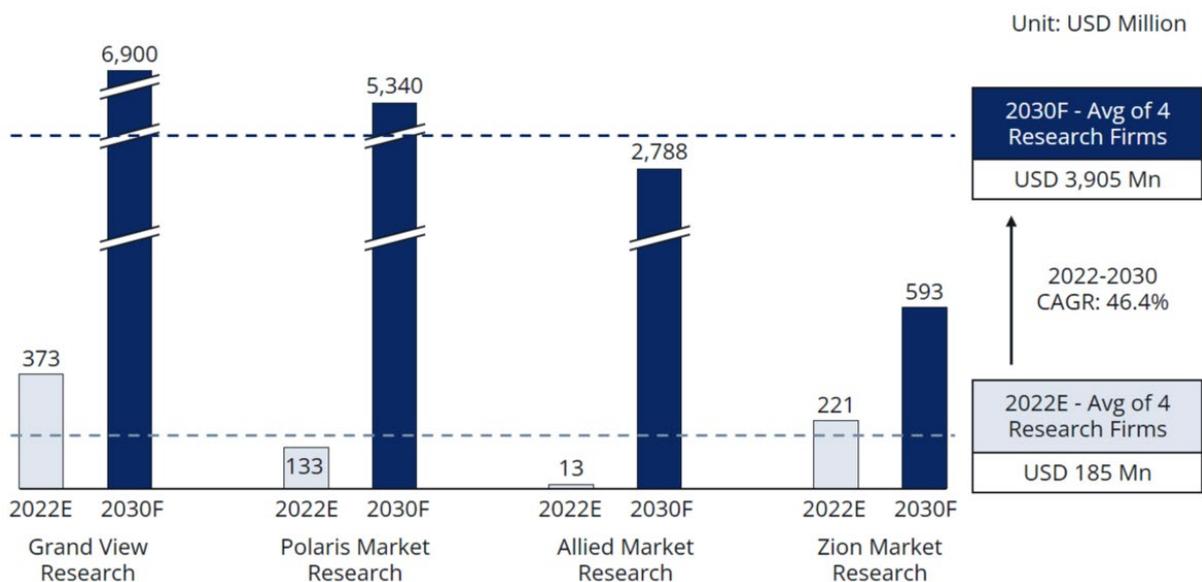
# Unlocking the Potential of Cultivated Meat: Overcoming Key Barriers

January 2024

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The emerging sector of cultivated meat aims to tackle challenges, including promoting healthier diet options, environmental sustainability, and animal welfare. Conventional meat is produced through the breeding of livestock on a farm, while cultivated meat is produced by cultivating animal cells in a controlled environment, such as a laboratory. However, the widespread adoption of cultivated meat among consumers on a broader scale faces barriers that must be surmounted, given the novel technologies involved in this industry. This article outlines the potential of the cultivated meat industry, discusses the primary barriers, and how [IGPI's business consulting services](#) can help clients in Singapore and beyond.

## The Potential of Cultivated Meat and their Benefits



**Figure 1; Market Size Projection of Cultivated Meat Industry<sup>1</sup>**

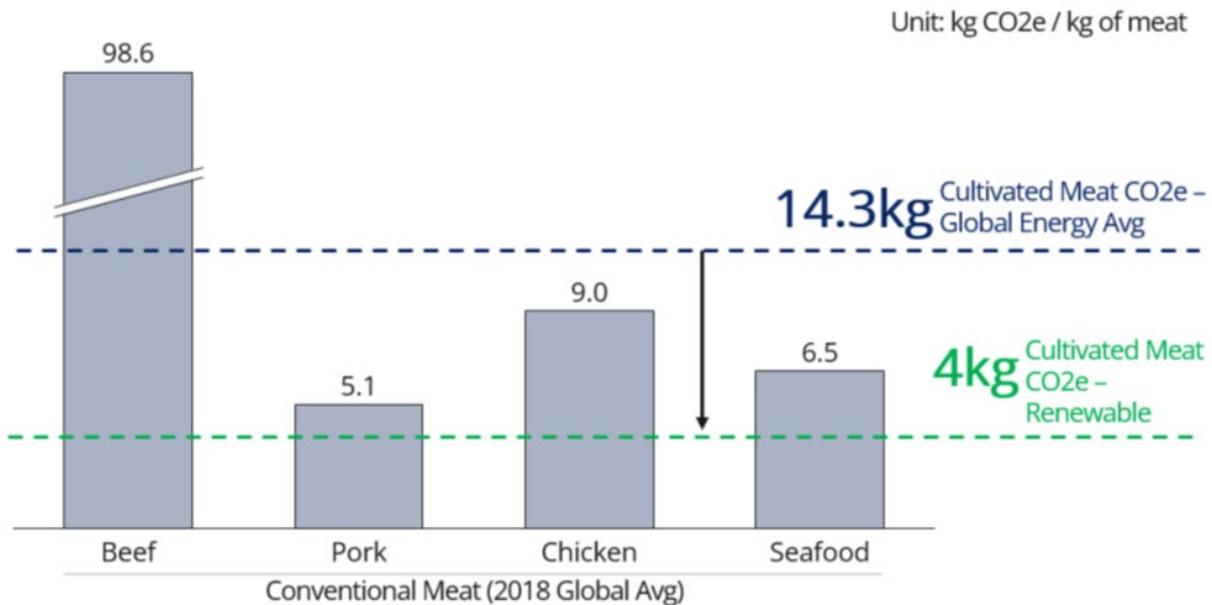
Experts from various research firms have reached a consensus on the promising trajectory of the cultivated meat industry, anticipating substantial growth between 2022 and 2030. Projections indicate a remarkable increase from an average of \$185 million in 2022 to an impressive \$3,905 million in 2030<sup>2</sup>, reflecting a significant compound annual growth rate (CAGR) of 46.4%. The rapid expansion in the market is attributed to the advantages offered by cultivated meat, such as promoting a healthier diet, environmental sustainability, and

<sup>1</sup> Grand View Research, Polaris Market Research, Allied Market Research and Zion Market Research

<sup>2</sup> Average of Grand View Research, Polaris Market Research, Allied Market Research and Zion Market Research

animal welfare<sup>3</sup>. The potential of cultivated meat to address key problems in the conventional meat industry provides it with the opportunity to become an alternative in a space that is worth USD 1.4 trillion in market size in 2023.

In an era where health awareness is increasing, consumers opt for healthier diets, and cultivated meat is poised to stand out. The nature of cultivated meat allows producers to select healthier animal cell variations for cultivation, offering more nourishing options, such as with lower saturated fat content and other health benefits, in their cultivated meat over conventional meat.



**Figure 2; CO<sub>2</sub> Emission of Conventional and Cultivated Meat<sup>4</sup>**

Meat is a staple in most diets and a key source of protein, but conventional meat contributes 16.5%-19.4% of GHG emissions<sup>4</sup>, making animal production the largest source of GHG emissions in the food ecosystem. One of the key benefits of cultivated meat is its potential to have a lower carbon footprint. A life cycle analysis by Sinke et al. shows that CO<sub>2</sub> emissions can be reduced by 95.9% in Beef (Cattle) and 55.6% in Chicken for cultivated meat (Renewable energy scenario).

Another key benefit of cultivated meat is its potential to address concerns related to animal welfare. Traditional meat production involves raising and slaughtering animals on an industrial scale, often leading to ethical issues. Cultivated meat eliminates the need to raise and kill entire animals as it only involves cultivating a sample of the animal's cell.

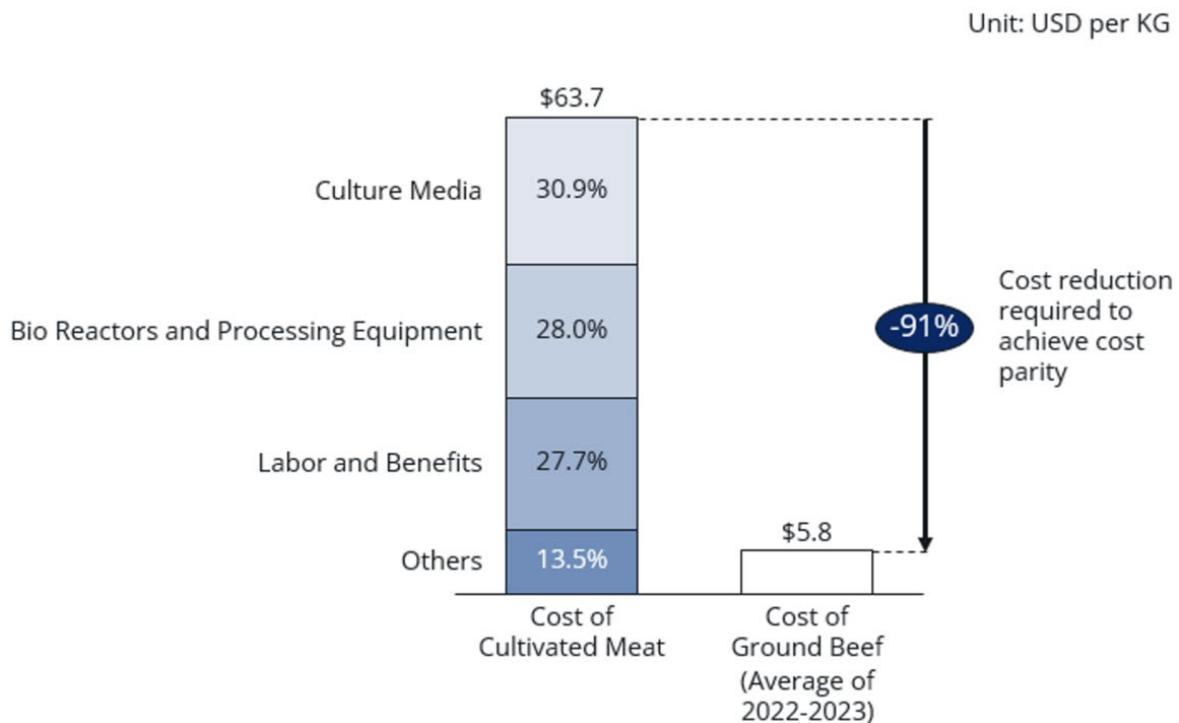
<sup>3</sup> Food for Thought: The Protein Transformation (2022)

<sup>4</sup> Ex-ante life cycle assessment of commercial-scale cultivated meat production in 2030 (2023)

## Pivotal Barriers for Widespread Adoption of Cultivated Meat

Cultivating meat leverages novel technologies and hence faces key barriers that need to be resolved prior to widespread adoption — cost parity, taste parity, and adherence to safety and regulatory standards are some of the key obstacles faced.

### 1. Cost Parity for Cultivated Meat



**Figure 3: Comparison of Cost of Cultivated Meat<sup>5</sup> and Conventional Beef<sup>6</sup>**

*Note: Others include electricity, transportation, repairs and maintenance, cold storage construction, building and property lease, IT infrastructure and Insurance. Cost of Ground Beef based on the gross farm value of ground beef in the United States, calculated from retail price of uncooked ground beef and accounting for the retail to gross farm value margin for beef in the United States. Average of 2022-2023 used due to higher inflation in 2023 that is expected to ease based on FAO's projection.*

In the quest for achieving cost parity, there is no silver bullet solution, but a suite of technological advancements will be required to complement each other and bring costs down (by ~91%) to reach a price-competitive level with conventional beef. The current key cost drivers of cultivated meat are the culture media (30.9%) — of which basal media form a crucial foundation by providing the essential nutrients for cell growth — and bioreactors and processing equipment (28.0%).

Among many initiatives, key efforts aimed at reducing culture media costs for cultivated meat production involve advancements in serum-free and food-grade culture media.

Culture media, traditionally developed for the pharmaceutical industry, largely rely on fetal bovine serum (FBS) and animal-derived components for the necessary factors for animal cells to proliferate; this leads to high cost of materials and animal welfare concerns. Many players in the cultivated meat field, aiming to reduce cost and address

<sup>5</sup> How much will large-scale production of cell-cultured meat cost? (2022)

<sup>6</sup> USDA (2024)

ethical concerns surrounding the use of FBS, have pursued advancements in serum-free culture media. Additionally, given the traditional use of culture media in the pharmaceutical industry, culture media are of pharmaceutical grade. Limitations of pharmaceutical-grade culture media include high cost and limited scalability for use in cultivated meat. The transition of pharmaceutical-grade to food-grade culture media will be critical to reducing costs and improving the scalability of cultivated meat during the mass production stage.

Enhancing innovation in bioreactor technologies tailored specifically for food production and larger-scale cultivation is imperative for the continued progress of the cultivated meat industry. At present, the industry heavily depends on pharmaceutical-grade bioreactors, which are not only expensive but also have limitations in scalability. The development of advanced bioreactors designed explicitly for the unique requirements of cultivated meat will facilitate more cost-effective and efficient large-scale production.

## 2. Taste Parity of Cultivated Meat

Taste emerges as a key criterion for cultivated meat consumption: it is the number one factor in the US, the UK, and Germany<sup>7</sup>. Plant-based meat has yet to achieve the taste and texture level that exactly replicates the taste and mouthfeel of conventional meat, but as cultivated meat is derived from actual animal cells, it has the technical feasibility to be able to achieve a closer resemblance to conventional meat in this aspect.

One such solution to improve taste parity is the innovation in the space of cultivated fats. While most startups have focused on cultivated muscle, as it constitutes 90% of meat, startups such as ImpacFat, Hoxton Farms, and CUBIQ Foods have taken a different approach and focus on cultivated fats, with the aim to provide their fats to plant-based and cultivated meat players to improve the taste and texture of their products. Studies have shown that fats are essential to improve the sensory profile of meat and contain fat-soluble vitamins such as Vitamins A, D, and E for a healthier diet.

## 3. Safety and Regulations

As a novel and nascent industry, ensuring the safety and regulatory compliance of cultivated meat products is paramount. Yet, it needs to be improved as most countries have taken a careful approach to regulatory approval in cultivated meat. As of January 2024, Singapore (in 2020), the United States (in 2023), and Israel (in 2024) are the only countries to approve the sales of cultivated meat by select approved startups.

Consumers often look to the regulations established by governments to determine if the food is safe for consumption. The lack of regulations may affect the availability of cultivated meat to consumers and deter their acceptance of switching to cultivated meat.

We believe that more regulatory and subsidy support will be required across regulatory bodies to envision a scenario where cultivated meat can be produced, sold, and consumed across different countries.

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<sup>7</sup> Food for Thought: The Protein Transformation (2022)

## Singapore as a Development Hub for Cultivated Meat Startups

Singapore has a supportive startup ecosystem for cultivated meat startups with the following three factors: 1. supportive regulatory framework; 2. financial incentives; and 3. alignment of cultivated meat with the nation's focus on food security challenges.

First, Singapore is the first country to embrace the commercialization of cultivated meat, issuing approval for the sale of cultivated meat to Eat Just Inc. and Good Meat within the country. It has also approved a cultivated meat food-processing license to Esco Aster to manufacture foods using cell-cultivated technologies.

Secondly, the government encourages cultivated meat startups to establish presence in Singapore by offering supportive financial incentives. Grants were provided through the Singapore Food Agency (Singapore Food Story 2.0 R&D Programme) and Enterprise Singapore on a case-by-case basis.

Lastly, cultivated meat aligns with Singapore's '30 by 30' plan, where the country will work towards producing 30% of the nation's food domestically by the Year 2030. As of 2022, Singapore still imports more than 90% of its food from over 160 other countries. As a land-scarce country with limited land area for livestock and crop agriculture, cultivated meat is one of the key solutions that can alleviate Singapore's food security problems, and we believe that, given this, the government will continue to take a supportive stance on the industry.

## How can IGPI add value to your pursuit in the cultivated meat space?

As technology advances rapidly in the field of cultivated meat, we believe that a carefully crafted and risk-mitigated approach to entering the market will be essential to navigate the current nascent industry. Private companies have many business opportunities, so it is important to seize the appropriate ones and take a proper approach. IGPI's consulting services can help identify such opportunities in Singapore. In such an environment, it is important to:

1. Build and select an appropriate business model; and
2. Select appropriate partners and connect them to the business

IGPI's Singapore office was established in 2013. Since then, we have supported many Japanese companies in their activities in ASEAN. To deal with the above issues, IGPI can provide a variety of business consulting services. Some of our consulting solutions include, but are not limited to:

### 1. Building and selecting appropriate business models

- ◆ Market prioritization study: Analyze the industry and competitive landscape in selected countries and the value chain through research and interviews to assess market potential.

- ◆ Develop the concept of ideation: Create a business model from the shortlisted ideas to allow for our clients to enter a new space in the technology-driven businesses in Southeast Asia, including Singapore.

## 2. Selecting appropriate partners and connecting them to different business

- ◆ Potential target/partners search: Identify and shortlist certain companies in Southeast Asia based on the unique needs and requirements of our clients
- ◆ Mergers and Acquisitions (M&A) advisory: Including project management, data room, due diligence, Q&A assistance, and closing with associated investors.

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To find out more about how IGPI can provide Japanese consulting support for businesses in Singapore and the region, browse through [our insight articles](#) or [get in contact with us](#).

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### About the author

**Mr. Tatsushi Sasakura** is a Senior Manager of IGPI Singapore. Tatsushi has worked at Mizuho Bank and Deloitte Tohmatsu Financial Advisory (DTFA) in Japan. At DTFA, he belonged to the Corporate Strategy team, specializing in business strategy planning, M&A advisory, and business due diligence. He was also engaged in crisis management, supporting clients to tackle emergencies. He has profound experience in the energy, consumer, and financial industries. He covered a wide range of clients, including Private Equity Funds and large-sized companies. Tatsushi graduated from Waseda University with a B.A. in International Political Science and Economy.

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### About IGPI

[Industrial Growth Platform Inc. \(IGPI\)](#) is a premier Japanese business consulting firm with a presence and coverage across Asian markets. IGPI was established by former members of the Industrial Revitalization Corporation of Japan (IRCJ) in 2007. IRCJ, a US \$100 billion Japanese sovereign wealth fund, is known as one of the most successful turn-around funds supported by the Japanese government.

In 2017, IGPI collaborated with the Japan Bank for International Cooperation (JBIC) to form JBIC IG, providing investment advisory services and supporting overseas investment. In 2019, JBIC, along with BaltCap, jointly established Nordic Ninja, a €100 million venture capital fund to focus on deep

tech sectors such as autonomous mobility, digital health, AR/VR/MR, artificial intelligence, robotics and IoT in the Nordic and Baltic region. In 2019, IGPI established IGPI Technology to focus on the area of science and technology. The company invests in technological ventures and provides hands-on management support. The company also provides business development support towards commercialization and monetization of technologies.

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