



At a glance 2020 State of the Industry

Plant-Based Meat, Eggs, and Dairy

In 2020, continued momentum in the plant-based industry led to rapid growth. Hundreds of new products launched, global plant-based meat retail sales passed \$4 billion, new technology demonstrated its potential to advance the market, and regulatory wins on food labeling helped ensure a level playing field. Despite food industry disruptions caused by the pandemic, the growth of plant-based proteins signals a growing global appetite for more-sustainable alternatives to conventional animal products.

Products

In 2020, companies advanced applications of plant-based technology to produce new products and enhance existing products across categories:

- Whole-cut meat
- Seafood
- Chicken
- Beef
- Pork
- Cheese
- Eggs
- Milk
- Yogurt
- Ice cream










Category expansion. Companies are innovating beyond the burgers that led the next-generation plant-based meat category. New products include plant-based Waygu beef from **JAT Oppenheimer** and **Top Tier Foods**, plant-based chicken from **Rebillyous Foods**, **Field Roast**, and **SIMULATE** (formerly NUGGS), and plant-based pork from **Beyond Meat** and **OmniPork**.

Seafood. Good Catch debuted **plant-based crab cakes, fish cakes, and fish burgers** in U.S. grocery stores and in Europe.

Price parity. Several plant-based meat companies moved closer to price parity, including Impossible Foods via **price reductions**, Beyond Meat via **value packs**, and Before the Butcher via its **Mainstream** line.

Sales

U.S. retail plant-based foods sales metrics, 2020

	 Dollar sales	 1-yr. dollar growth	 2-yr. dollar growth	 Household penetration	 Repeat rate	 1-yr. dollar growth compared to animal-based
 Total plant-based foods	\$7 billion	27%	43%	57%	78%	2x
 Plant-based meat	\$1.4 billion	45%	72%	18%	63%	2x
 Plant-based milk	\$2.5 billion	20%	27%	39%	75%	2x

Total U.S. retail plant-based food sales grew two times as fast as animal-based food sales in 2020, totaling \$7 billion.

Plant-based meat crossed the billion-dollar mark and grew 45% in dollar sales from 2019.

Plant-based dairy categories in aggregate grew by 24% to \$4.4 billion.

The **plant-based egg** category grew by 168%.

Note: The data presented in these figures is based on custom GFI and PBFA plant-based categories created by refining standard SPINS categories. Due to the custom nature of these categories, the presented data will not align with that of standard SPINS categories
Source: SPINS Natural Enhanced Channel, SPINS Conventional Multi Outlet Channel (powered by IRI) | 52 Weeks Ending 12-27-2020

Investments

Investment in plant-based meat, eggs, and dairy companies skyrocketed in 2020. Plant-based protein companies raised \$2.15 billion—more than three times the amount raised in 2019—representing 48% of all-time sector funding.

Category	2020	1980-2020	Highlights
Total invested capital	\$2.15B	\$4.43B	2020 invested capital grew 222% from 2019.
Invested capital deal count	93	419	2020's largest investment was \$500M (Impossible Foods).
Unique investors	196	645	The number of unique investors grew 44% from 2019.
Liquidity event capital	\$15M	\$25.3B	2020's largest liquidity capital investment was SavorEat's \$12.6 million IPO on the Tel Aviv Stock Exchange.
Liquidity event count	9	68	
Other financing capital	\$31M	\$127M	2020's largest other financing capital investment was \$10M in PIPE financing for The Very Good Butchers.
Other financing count	5	14	

Science and technology

2020 saw several developments in **spinning technology**, a promising technology for creating whole muscle products by spinning plant-based proteins into fibers, **shear-cell technology**, which creates fibrous texture by applying shear force to plant-proteins between two cylindrical rotating plates, and **3D printing**, which can enable the fabrication of highly sophisticated products that can mimic whole-muscle meat cuts.

Government and regulation

Standard of identity. The U.S. FDA reopened the comment period on a 2005 proposed rule to establish principles for determining a food standard of identity.

Label censorship. The E.U. rejected a label censorship law. The battle continues on the plant-based dairy front. In the U.S., Virginia and California blocked label censorship laws by veto and preliminary injunction, respectively.



About GFI

The Good Food Institute is a 501(c)3 nonprofit organization developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.



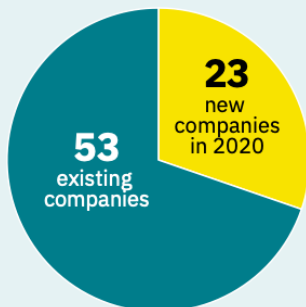
At a glance 2020 State of the Industry

Cultivated Meat

2020 was a year of firsts for the cultivated meat industry—capped off with a head of government consuming cultivated meat in Israel and the first commercial sale of cultivated meat in Singapore. The regulatory approval of a cultivated chicken product in Singapore is a good sign for regulatory green lights in other countries, and the sector made headway in advancing the viability of industrial-scale production.

Commercial landscape

Companies dedicated to producing cultivated meat



↑ **43% YOY increase**

First commercial launch. Eat Just launched the commercial sale of its cultivated chicken bites at restaurant 1880 in Singapore. 1880 sold the product to consumers for the first time via a series of invitation-only dinners in December before adding it to the menu in early 2021.

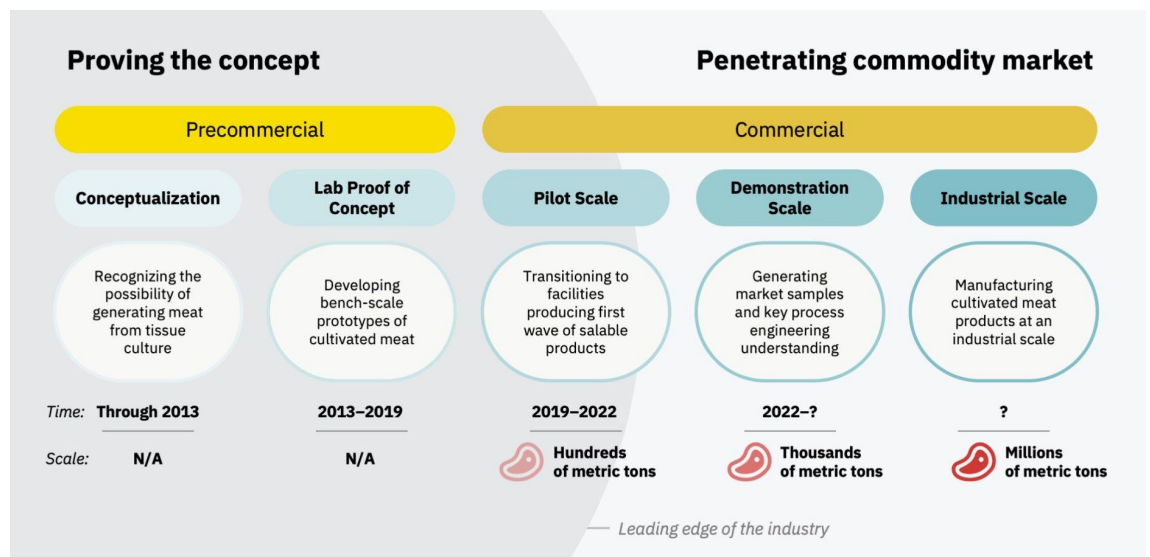
Spotlight: seafood. 3 of 8 major 2020 cultivated meat tasting events were for seafood products—fish fillet, sushi-grade salmon, and lobster.

In 2020, companies advanced cultivated meat technology and pursued the production of a wide variety of meat types, including:

- Beef
- Chicken
- Pork
- Shrimp
- Duck
- White fish
- Sturgeon
- Salmon
- Tuna
- Lamb
- Foie gras
- Fish maw
- Horse
- Kangaroo
- Lobster

Leading edge of cultivated meat production

Companies at the leading edge of the industry are now manufacturing cultivated meat at pilot scale, a crucial early step to assess the viability of industrial-scale production.





Investments

Investment in cultivated meat companies topped \$350 million in 2020, nearly double the previous cumulative investment in the industry. 2020 also saw the industry's first Series B funding rounds.

Category	2020	2016-2020	Highlights
Total invested capital	\$366M	\$505M	2020 invested capital grew 487% from 2019.
Invested capital deal count	49	125	2020's largest investment was \$186M (Memphis Meats).
Unique investors	94	245	The number of unique investors grew 62% from 2019.
Series B funding rounds	2	2	Included Memphis Meats and Mosa Meat.
Series A funding rounds	6	12	Included Blue Nalu, Shiok Meats, IntegriCulture, and Biomilq.



Science and technology

Several techno-economic assessments revealed the technical and financial feasibility of scaling up cultivated meat production. **Recombinant proteins** and **growth factors** are dominant cost drivers of production; as raw-material costs decrease, **bioreactors** and **facilities** will represent a lion's share of costs. Challenges remain in **chemical** and **biological engineering** as well as in securing data for **cellular metabolism metrics**. Studies also revealed that fundamental technological breakthroughs are not necessary to eventually achieve economically viable production. Learn about more science and technology breakthroughs from GFI's [research grant program](#).



Government and regulation

Regulatory approval. The Singapore Food Agency (SFA) became the first national regulator to **green-light the sale of a cultivated meat product**. The approval of Eat Just's cultivated chicken, for use as an ingredient in the company's chicken bites, was the culmination of a regulatory process developed over more than two years.

Head of state tasting. GFI Israel and Aleph Farms hosted **Israeli prime minister Benjamin Netanyahu** for a tasting of Aleph Farms' cultivated steak. Netanyahu directed the **appointment of a body** to serve the industry.

Public funding. Both the U.S. and the E.U. provided their first substantial public R&D funding in the sector.



[Download the full report.](#)

About GFI

The Good Food Institute is a 501(c)3 nonprofit organization developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.

At a glance 2020 State of the Industry

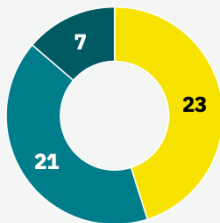
Fermentation: Meat, Eggs, and Dairy

Fermentation is increasingly being used as an enabling technology in alternative proteins. In 2020, the fermentation sector continued to expand, with several key developments across the commercial, product, investment, science and technology, and government and regulation landscapes.



Commercial landscape

Number of companies by type of fermentation



- Precision fermentation** (specially designed microbial hosts produce ingredients)
- Biomass fermentation** (microorganisms produce large amounts of protein)
- Traditional fermentation** (live microorganisms to modulate and process plant-derived ingredients)

New startups. Thirteen startups dedicated to the use of fermentation for alternative proteins launched, along with new suppliers focused on fermentation-enabled alternative protein ingredients.

Precision fermentation. Activity in precision fermentation increased, with nine of the 13 new companies focused on precision fermentation, three on biomass (an area with significant activity in 2019), and one on traditional fermentation.

Known companies. Fifty-one known companies are now dedicated to fermentation-enabled alternative proteins, an increase of 34 percent from 2019.

Business lines. More than 30 additional companies have a business line in alternative protein fermentation.



Products

In 2020, companies advanced applications of fermentation technology to produce products and enhance plant-based products across categories:

- Whole-cut meat
- Ground meat
- Seafood
- Eggs
- Milk
- Cheese
- Gelatin
- Fats
- Oils
- Pet food

Whole cuts. Meati Foods launched whole-cut steak and chicken made through **submerged fermentation**. Atlast Food Co. introduced their brand **MyBacon** produced via biomass fermentation and **presold all planned capacity through 2023**. Prime Roots sold out their soft-launch inventory **within hours**, launching animal-free bacon, chicken, pork, and beef products in their **online store**.

Dairy. **Perfect Day** commercially debuted animal-free ice cream with recombinant casein and whey protein, including a retail launch via Brave Robot and introductions at multiple ice cream chains. Other companies, including **New Culture**, **Change Foods**, **Cultivated**, and **LegenDairy**, recently emerged to create dairy proteins and fats.



Investments

Investment in fermentation technology skyrocketed in 2020. Fermentation companies raised \$587 million—more than two times the amount raised in 2019—representing 57% of all-time sector funding.

Category	2020	2013–2020	Highlights
Total invested capital	\$587M	\$1B	2020 invested capital grew 109% from 2019
Invested capital deal count	28	102	2020's largest investment was \$300 million (Perfect Day).
Unique investors	80 new	259	The number of unique investors grew 45% from 2019.
Series A/A1/A2 rounds	7	19	Top 3 by dollars raised: Air Protein (\$32M), The Protein Brewery (\$26M), Meati Foods (\$25M).
Series B rounds	1	3	Nature's Fynd (\$80M).
Series C/C1 rounds	1	3	Perfect Day (\$300M).



Science and technology

GFI (via its [research grant program](#)) funded studies on fermented oat proteins and fermented flavor bases for plant-based meat. **TurtleTree Labs** spun out **TurtleTree Scientific** and partnered with a filamentous fungi company on growth factors. **White Dog Labs** bought an ethanol plant to convert it for [aquaculture feed production](#). **Quorn** opened a [Fermentation Development Centre](#) to accelerate their protein research. **3F Bio** opened a [pilot-scale facility](#).



Government and regulation

Regulatory approvals. The [Singapore Food Agency](#) and [Food Standards Australia New Zealand](#) approved Impossible Foods' soy leghemoglobin. The U.S. FDA sent Perfect Day a [no questions letter](#) for their beta-lactoglobulin.

Investments and funding. The U.S. Dept. of Energy [invested](#) in Meati Foods; the European Commission awarded a grant to Mycorena; 3F Bio, along with a consortium of partners, [received a grant from EU Horizons](#). Perfect Day announced [plans for an R&D center](#) with Singapore's Agency of Science, Technology and Research (A*STAR).



[Download the full report.](#)

About GFI

The Good Food Institute is a 501(c)3 nonprofit organization developing the roadmap for a sustainable, secure, and just protein supply. We identify the most effective solutions, mobilize resources and talent, and empower partners across the food system to make alternative proteins accessible, affordable, and delicious.