#### SOSƏ The Open Innovation Company.

REPORT

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July 2021

# Next generation protein -65 technologies shaping the future.

A look into the market segments and emerging technologies shaping the future of protein.

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Data sources used in this report

SOSA Q | CB Insights | Pitchbook | Startup Nation Central | IVC Photos Courtesy of Impossible Foods

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## 01 Market overview

By now, the terms "Impossible Burger" and "Beyond Meat" have become common knowledge amongst conscious consumers and a growing mainstream audience. In 2019, Burger King made headlines when it introduced the "Impossible Whopper" nationwide. In early 2021, McDonald's and Beyond Meat <u>announced</u> their strategic global partnership, which means we're likely going to see plant-based happy meals making people smile all over the world. These new menu items offered by the largest fast-food conglomerates reflect a massive cultural shift towards the way consumers approach food -- a transformation that has been in the works for well over two decades.

To get a little bit of context on the prominence of plant-based meat - it was in 2012 that Beyond Meat launched its first product into the market. Four years later, in 2016, we saw yet another historical milestone when Impossible Foods Inc., a California-based tech company, released their plant-based meat substitute "Impossible Burger." Both of these meat alternatives launched to staggering commercial success, as they filled a major void in the market (and stomachs) of those searching for "meatless meat." Furthermore, the success of these products also validated the importance of cross-industry collaboration, as the R&D necessary to create these alternatives often includes next-generation technology from the worlds of biochemistry, agriculture tech, and industrial automation. Finally, we learned that consumers are ready to eat healthy, bio-engineered food, so long as no animals and the environment were harmed – and so: food tech was born.



Among the pillars constructing the global food tech industry are companies providing bioengineered foods, consumer meal kits, food delivery, waste processing, and automation of unmanned kitchens, eerily named "ghost kitchens."

Companies developing new types of food products enjoy the growing interest of investors worldwide. 2020, the year of the global pandemic, brought a total of \$18B to food-producing tech companies in funding, a record that has since been broken in 2021, reaching \$20.6B in funding (2021 YTD).

Parallel to the investment increase is the rapidly growing consumer demand for healthier food manufactured focusing on environmental responsibility. Now, more than ever, sustainable and healthier products of any kind are perceived as simply "better" than products that don't take the environment and animal welfare into account.

This report focuses on the promising segment of alternative protein solutions identified by SOSA as the frontrunners of food-producing food tech companies.

## o2 Market definition

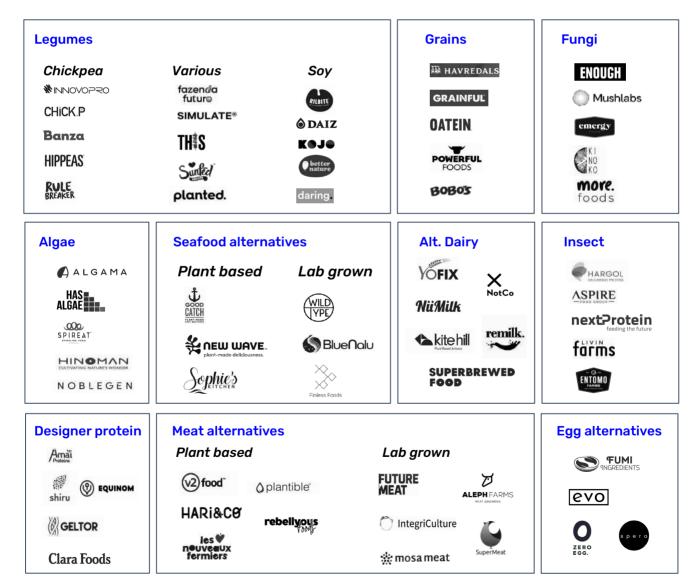
The next generation protein market consists of companies that incorporate various types of plants as well as new food-technologies that offer people healthy and sustainable alternatives to animal derived protein.

The market includes companies that utilize plants and crop extracts such as grains, legumes, fungi, algae, and more to offer new protein-rich options. The market also consists of companies that leverage synthetic biology to make (animal-free) lab-grown alternatives to meat and seafood.



## o3 Next generation protein: market map

The market comprises companies that offer new foods derived from an array of protein-packed natural superfoods such as grains, legumes, fungi, algae, and more. Companies are also developing lab-grown and plant-based meat and seafood alternatives. In addition, companies combine biology, protein optimization, and fermentation to create designer proteins, while others are offering plant-based dairy alternatives and ways of capitalizing on the world's abundance of insects for protein.



#### Technologies pioneering the future of protein (seed - series B\*)

This map contains private, active companies and is not exhaustive of every company in this space, including current market leaders with the Foodtech protein space ("current generation"). Companies were selected based on funding activity, investor quality, and momentum, among other criteria. The categories featured in the map are not all mutually exclusive. This is one way to segment the market.

## 04 Legumes technologies

The legume family consists of plants that produce a pod with seeds inside. Common edible legumes include lentils, peas, chickpeas, beans, soybeans, and more. Companies are incorporating multiple types of legumes into their protein products. Most legumes startups are using chickpeas and soybeans to create healthy and sustainable protein-packed foods, beverages, concentrates, and more.

#### Select technologies to watch



Fazenda Futuro has developed the Futuro Burger, a plant-based meat alternative made from pea protein.

Founded: 2019 Disclosed Funding: \$33.5M Investment Stage: Series B (09/02/20) Select Investors: ENFINI Investments, BTG Pactual



Auckland, New Zealand

<u>Sunfed Meats</u> offers plant-based chicken made from pea protein and gluten, soy, and GMO-free.

Founded: 2015 Disclosed Funding: \$9.44M Investment Stage: Series A (11/27/18) Select Investors: Blackbird Ventures, K1W1

### planted.

Zurich, Switzerland

<u>Planted</u> creates meat substitutes with pea protein, pea fiber, sunflower oil, and water.

Founded: 2019 Disclosed Funding: \$25.9M Investment Stage: Series A (03/08/21) Select Investors: Vorwerk Ventures, Blue Horizon Ventures

## TH┋S

London, United Kingdom

**THIS** offers plant-based meat substitutes for chicken and pork from soybean and pea protein.

Founded: 2019 Disclosed Funding: \$23.73M Investment Stage: Early Stage VC (06/04/21) Select Investors: Business Growth Fund, BACKED VC, CPT Capital

#### **SIMULATE®**

New York, United States

**SIMULATE** developed a chicken nugget simulation that uses pea protein technology.

Founded: 2018 Disclosed Funding: \$57M Investment Stage: Series B (06/08/21) Select Investors: Seven Seven Six, McCain Foods, NOMO Ventures

## o5 Chickpea technologies

Chickpeas are a sustainable, healthy, and affordable source of plant-based protein. Startups are creating technology-based products to derive chickpea protein concentrates for use across multiple food and beverage products, others are using chickpeas to boost the protein content of foods such as pasta, and companies are also making high-protein chickpea-based snacks all free from top allergens and GMOs.

#### Select technologies to watch

#### Banza

New York, United States

**Banza** offers high-protein pasta products made from chickpeas.

Founded: 2014 Disclosed Funding: \$31.3M Investment Stage: Series B (11/12/19) Select Investors: Union Square Hospitality Group, Prelude Growth

#### HIPPEAS

New York, United States

<u>Hippeas</u> produces gluten-free, vegan, kosher, and non-GMO, chickpea snacks.

Founded: 2015 Disclosed Funding: \$72M Investment Stage: Series C (01/26/21) Select Investors: The Craftory, CAVU Venture Partners Rishpon, Israel

**InnovoPro** has developed a technology to extract 70% – chickpea protein concentrate.

Founded: 2013 Disclosed Funding: \$22.25M Investment Stage: Series B (10/29/20) Select Investors: Migros, Jerusalem Venture Partners, CPT Capital

## CHICK.P

Rehovot, Israel

**ChickP** can extract up to 90% pure protein out of the Chickpea seed for various F&B applications.

Founded: 2016 Disclosed Funding: \$0.5M Investment Stage: Post seed, corp. minority (4/27/20) Select Investors: Growthwell **RULE** BREAKER

New York, United States

Rule Breaker produces chickpea snacks packed with protein and fiber, low in sugar and calories.

Founded: 2019 Disclosed Funding: Undisclosed Investment Stage: Later Stage VC (02/15/21) Select Investors: Bimbo Ventures

## oo Soy technologies

The soybean or soya bean is a species of legume native to East Asia, widely grown for its edible bean, which has numerous uses. Soy is processed into three kinds of high protein commercial products: soy flour, concentrates, and isolates. Startups are using soy to produce alternatives for minced meat, raw materials for use in other plant-based foods, soy-based snacks, tempeh, and other meat and egg substitutes.

#### Select technologies to watch



Scotland, United Kingdom

Daring Foods offers plant-based chicken alternatives.

Founded: 2018 Disclosed Funding: \$58.67M Investment Stage: Series B (05/18/21) Select Investors: D1 Capital Partners



Japan

**DAIZ** develops raw materials from germinated soybeans, for soy-based meat products.

Founded: 2015 Disclosed Funding: \$27.99M Investment Stage: Series B (04/19/21) Select Investors: ENEOS Holdings, Nippon Steel



London, United Kingdom

Better Nature develops a tempeh fermentation process using beans, legumes, nuts, or grain.

Founded: 2018 Disclosed Funding: \$2.92M Investment Stage: Seed (02/23/21) Select Investors: Undisclosed



Netanya, Israel

**<u>Rilbite</u>** offers a substitute for minced meat from vegetables, grains, legumes, and spices.

Founded: 2018 Disclosed Funding: \$0.60M Investment Stage: Seed (12/1/18) Select Investors: The Kitchen FoodTech Hub



Illinois, United States

**Kojo** offers plant-based imitation beef-jerky snacks.

Founded: 2018 Disclosed Funding: \$0.22M Investment Stage: Seed (4/11/19) Select Investors: SOSV, Food-X

## o7 Grain technologies

Grains are high in protein and include cornmeal, kamut (wheat berries), teff, quinoa, whole wheat pasta, wild rice, millet, couscous, oatmeal, and buckwheat. Tech companies are primarily offering oat-based high-protein snacks such as bars, cookies, and brownies. Others are offering full entrees and ready to eat meal-kits as well as various oat-based food and drink products such as oat-based milk alternatives.

#### Select technologies to watch

#### A HAVREDALS

Uppsala, Sweden

Havredals produces oat-based food alternatives to meat and dairy.

Founded: 2019 Disclosed Funding: 0.31M Investment Stage: Grant (01/15/21) Select Investors: Uppsala Innovation Centre



Colorado, United States

**Bobo's** makes snack bars that contain organic whole oats, and are gluten and soy-free.

Founded: 2005 Disclosed Funding: \$17M Investment Stage: Series B (7/22/19) Select Investors: Boulder Food Group, BIGR Ventures, Ridgeline

#### GRAINFUL

New York, United States

**Grainful** offers frozen heat and eat entrees and meal kits made from organic steel-cut oats.

Founded: 2009 Disclosed Funding: \$6.66M Investment Stage: Later Stage VC (6/27/18) Select Investors: Red Bear Angels



Florida, United States

#### Powerful Foods

manufactures and markets all-natural, high-protein foods and beverages.

Founded: 2013 Disclosed Funding: \$5M Investment Stage: Private Equity (3/3/20) Select Investors: MMG Consumer Brands

#### OATEIN

Whitley Bay, United Kingdom

**<u>Oatein</u>** offers oat-protein snack products such as bars, nut butters, brownies, and cookies.

Founded: 2016 Disclosed Funding: \$0.06M Investment Stage: Seed (1/28/19) Select Investors: Pete Jones

## os Fungi technologies

A fungus is any member of the group of eukaryotic organisms that includes microorganisms such as yeasts and molds, as well as the more familiar mushrooms. Most notable is Mycoprotein, a form of single-cell protein, also known as fungal protein. Tech companies are synthesizing Mycoprotein and using precision fermentation technologies to create new food products including meat-alternatives using fungi.

#### Select technologies to watch



Scotland, United Kingdom

**ENOUGH** offers zero-waste fermentation high-quality protein, converting starch to protein.

Founded: 2015 Disclosed Funding: \$60.2M Investment Stage: Series B (06/20/21) Select Investors: Nutreco and Olympic Investments



Colorado, United States

**Emergy Foods** makes and distributes the fungi-protein brand known as Meati Foods, and more.

Founded: 1996 Disclosed Funding: \$101.0M Investment Stage: Series B (07/06/21) Select Investors: Acre Venture Partners and Bond Capital



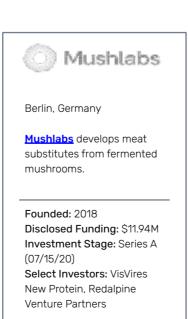
Rehovot, Israel

Kinoko-Tech is an early-stage company seeking to offer a specifically grown high-protein edible mushroom.

Founded: 2019 Disclosed Funding: \$0.55M Investment Stage: Grant (08/01/20) Select Investors: Israel Innovation Authority

#### Tel Aviv, Israel More Foods use yeast and other non-conventional protein sources to make meat-like products. Founded: 2019

Disclosed Funding: \$550K Investment Stage: Seed Select Investors: undisclosed



## 09 <u>Algae</u> technologies

Algae contains all essential and non-essential amino acids making it a complete protein source. There is over three times the amount of the amino acid arginine than what is found in whey protein and almost the same amount of glutamine. Tech companies are using novel forms of algae in food such as a single microorganism called Euglena gracilis, others are developing proprietary plants such as Mankai, and more.

#### Select technologies to watch

#### NOBLEGEN

Toronto, Canada

Noblegen makes protein, from a type of single microorganism, Euglena gracilis.

Founded: 2013 Disclosed Funding: \$407.12M Investment Stage: Series C (07/06/21) Select Investors: Undisclosed CULTIVATING NATURE'S WONDER

Tel Aviv, Israel

Hinoman cultivates mankai, an all-natural protein and vitamin-packed plant.

Founded: 2010 Disclosed Funding: \$15M Investment Stage: Corp. min. (3/27/17) Select Investors: Ajinomoto ALGAMA

Evry, France

Algama creates food products using microalgae including eggs, meat, or emulsifiers.

Founded: 2013 Disclosed Funding: \$8.33M Investment Stage: Series A (9/12/19) Select Investors: VegInvest, Blue Horizon, Beyond Impact

#### HAS Algae

New South Wales, Australia

Has Algae is making ordinary foods into superfoods by using the nutritional power of micro-algae.

Founded: 2019 Disclosed Funding: \$0.05M Investment Stage: Seed (3/9/20) Select Investors: Growlabs SPIREAT

Cremona, Italy

**Spireat** sells spirulina, a type of freshwater microalgae that has three times the protein of a steak.

Founded: 2016 Disclosed Funding: \$0.06M Investment Stage: Seed (6/19/19) Select Investors: EIT Food, Impact Hub Milano

## Alternative seafood technologies

Fish make up 16% of animal protein consumed globally, and demand is set to rise, according to the United Nations' Food and Agriculture Organization. In tandem, fish populations are being decimated around the world. Tech companies are leveraging advances in biology and computational sciences to create fish alternatives from lab grown fish cells, and others are combining plant-based ingredients to make new fish.

#### Select technologies to watch



Pennsylvania, United States

Good Catch Foods creates plant-made delicacies such as fish-free tuna and crab cakes.

Founded: 2016 Disclosed Funding: \$71.85M Investment Stage: Series B2 (04/07/21) Select Investors: LDC Innovations



California, United States

Sophie's Kitchen offers plant-based seafood to enjoy a range of seafood variants.

Founded: 2011 Disclosed Funding: \$0.04M Investment Stage: Grant (03/26/17) Select Investors: SPRING Singapore



California, United States

<u>New Wave</u> makes plant-based shrimp from seaweed, soy protein and natural flavors.

Founded: 2015 Disclosed Funding: \$18.34M Investment Stage: Series A (01/06/21) Select Investors: Tyson Ventures, SOSV, Gaingels Syndicate

#### **S**Blue∩alu

California, United States

**BlueNalu** specializes in cellular aquaculture for healthy, safe, and trusted seafood products.

Founded: 2017 Disclosed Funding: \$84.5M Investment Stage: Early Stage VC (01/19/21) Select Investors: Rage Capital, Thai Union Group, QC Ventures



California, United States

<u>Wild Type</u> is developing cultured salmon that is created directly from salmon cells.

Founded: 2016 Disclosed Funding: \$16M Investment Stage: Series A (10/8/19) Select Investors: Spark Capital, CRV, Maven Ventures, Root Ventures



Founded: 2017 Disclosed Funding: \$14M Investment Stage: Series A (12/10/20) Select Investors: Hemisphere Ventures, Social Starts and VU Venture Partners <sup>11</sup> Alternative dairy technologies

Alternative dairy products that do not require animals are a viable avenue for replacing unsustainable practices in the dairy industry. Additionally, for people who are lactose intolerant, alternatives can help avoid symptoms and maintain health. Tech companies are creating dairy alternatives such as plant-based milk, probiotics, non-dairy cheese, mayonnaise, and more.

#### Select technologies to watch



California, United States

Kite Hill supplies plant-based foods such as non-dairy cheese, nut milk, yogurt, and more.

Founded: 2013 Disclosed Funding: \$84.38M Investment Stage: Series C (09/06/19) Select Investors: undisclosed



Santiago, Chile

**NotCo** uses AI to create food from plants such as Not Mayo, Not Milk, and Not Ice Cream.

Founded: 2015 Disclosed Funding: \$128.25M Investment Stage: PE Growth (03/28/21) Select Investors: Union Square Hospitality Group



Ashdod, Israel

Yofix manufactures dairy and soy-free fermented plant based pre and probiotic foods.

Founded: 2014 Disclosed Funding: \$5.14M Investment Stage: Series A (2/5/20) Select Investors: LionTree Partners, Bel Group

#### NüMilk

New York, United States

NuMilk makes fresh and dairy-free "make your own" milk stations at select retail grocery shops.

Founded: 2018 Disclosed Funding: \$12M Investment Stage: Crowdfunding (06/30/21) Select Investors: Kickstarter



Ness Ziona, Israel

**Remilk** is a precision fermentation company creating dairy proteins for dairy products – without cows.

Founded: 2019 Disclosed Funding: \$11.3M Investment Stage: Series A (12/09/20) Select Investors: Fresh.Fund, Hochland, Tnuva, Tempo Beer

## SUPERBREWED

Delaware, United States

#### Superbrewed Food is

microbial fermentation based alternative protein company creating animal-free products.

Founded: 2016 Disclosed Funding: \$24M Investment Stage: Series C Select Investors: Invest Nebraska, U.S. Department of Energy, NSF, Bird Foundation,Musea Ventures

## <sup>12</sup> Insect protein technologies

Compared gram to gram with conventional beef, raising insect protein requires 8 to 14 times less land, 5 times less water, and emits 6 to 13 times less greenhouse gasses. There are over 1,900 edible insect species on Earth, many of which are already part of the diet in many countries. Tech companies are offering high-protein foods from insects such as: grasshoppers, Black Soldier Fly larvae, crickets, and more.

#### Select technologies to watch



Orsay, France

nextProtein harvests Black Soldier Fly larvae as an abundant insect-based source of protein.

Founded: 2014 Disclosed Funding: \$12.48M Investment Stage: Series A (5/20/20) Select Investors: Raise Impact, Blue Oceans Partners, Telos



Misgov, Israel

**Hargol** grows grasshoppers quickly in sanitary conditions for a reliable, quality protein source.

Founded: 2014 Disclosed Funding: \$6.15M Investment Stage: Seed (4/16/20) Select Investors: Sirius Venture Capital, SLJ Investment Partners



Ontario, Canada

**Entomo Farms** is a manufacturer of cricket flour and insect protein.

Founded: 2014 Disclosed Funding: undisclosed Investment Stage: Later Stage VC (01/26/21) Select Investors: undisclosed

#### ASPIRE

Austin, Texas

Aspire makes high protein and micronutrient-rich food solutions derived from the supply of insects.

Founded: 2013 Disclosed Funding: \$32.19M Investment Stage: Grant (07/23/20) Select Investors: Sustainable Development Technology Canada

## farms

#### Graz Austria

Livin Farms offers a desktop insect farm that helps grow a clean homemade protein supplement.

Founded: 2015 Disclosed Funding: \$0.02M Investment Stage: Seed (12/20/2019) Select Investors: SOSV, HAX, Agro Innovation Lab

## <sup>13</sup> Designer protein technologies

Companies are leveraging advances in synthetic biology, precision fermentation, and protein optimization to create sustainable, high-performance consumer proteins, including the protein in blood that makes meat taste like meat. Companies are offering a range of products that incorporate designer proteins including novel sweeteners, egg-substitutes, precision yeast compounds, food additives, and more.

#### Select technologies to watch

#### **Clara Foods**

California, United States

**<u>Clara Foods</u>** aims to provide an un-compromised egg by taking the chicken out of the equation.

Founded: 2014 Disclosed Funding: \$71.79M Investment Stage: Later Stage VC(02/10/20) Select Investors: Minerva Foods, Rage Capital and SOSV GELTOR

California, United States

<u>Geltor</u> makes performance protein for wellness-focused CPG businesses.

Founded: 2015 Disclosed Funding: \$117.5M Investment Stage: Series B (07/27/20) Select Investors: CPT Capital Givat Brenner, Israel

**Eauinom** is a developer of seed breeding technology to custom-design alternative proteins.

Founded: 2012 Disclosed Funding: \$36.25M Investment Stage: Series C (06/22/21) Select Investors: BASF Venture Capital, Fortissimo Capital, Trendlines

## shiru

California, United States

**Shiru** is looking at proteins for creating certain kinds of quantities that are used in food additives.

Founded: 2019 Disclosed Funding: \$3.65M Investment Stage: Seed (10/24/19) Select Investors: Y Combinator, Lux Capital



Rehovot, Israel

Amai Proteins is a computational protein design biotech company aimed at the food market.

Founded: 2016 Disclosed Funding: \$12.3M Investment Stage: Grant (01/01/20) Select Investors: EIT Food <sup>14</sup> Alternative meat technologies

Companies are offering plant-based meat derived from combinations of legumes, grains, and vegetables. Innovative plant-based meat companies are finding new ways of designing products that retain the same cooked structure and taste of animal meat. Other companies are pioneering cellular agriculture using animal cells (without animals) to grow protein with the same structure and taste as real meat.

#### Select technologies to watch

(v2) food

Sydney, Australia

V2food makes meat from legumes. The company's 'mince' is said to look and taste like meat.

Founded: 2018 Disclosed Funding: \$78.97M Investment Stage: Series B (10/19/20) Select Investors: Shanghai Esen Agro Products & Technology Development Oplantible<sup>®</sup>

California, United States

Plantible Foods creates protein delivered from organic lemna, also known as duckweed.

Founded: 2018 Disclosed Funding: \$5.1M Investment Stage: Series A (3/27/20) Select Investors: Lerer Hippeau Ventures, Vectr Ventures



Washington, United States

**Rebellyous** has an innovative low-energy manufacturing tool to produce plant-based chicken.

Founded: 2017 Disclosed Funding: \$14.76 Investment Stage: Early Stage VC (08/31/2020) Select Investors: Climate Capital, KBW Ventures, Good Startup



Tokyo, Japan

IntegriCulture develops clean meat, clean foie gras, and other cellular agriculture products.

Founded: 2015 Disclosed Funding: \$10.2M Investment Stage: Grant(08/27/20) Select Investors: New Energy and Industrial Technology Development Organization

# Plant-based seafood

Rehovot, Israel

Aleph uses the four core cell types of farmed beef, to recreate a real food experience.

Founded: 2017 Disclosed Funding: \$119.45M Investment Stage: Series B (07/07/21) Select Investors: L Catterton, DisruptAD

#### future Meat

#### Jerusalem, Israel

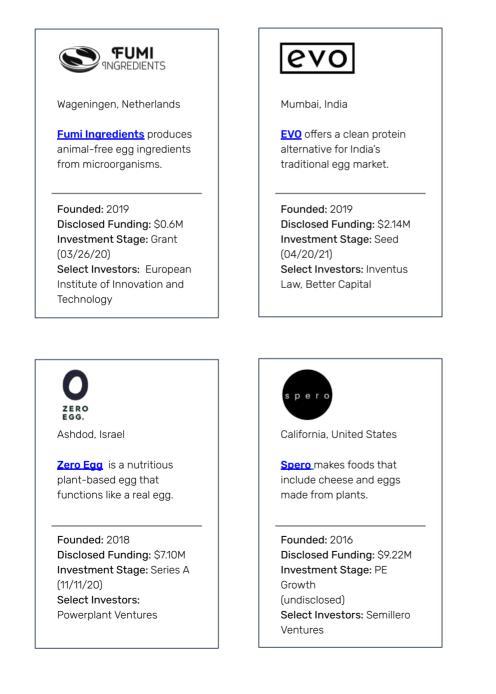
**Euture Meat** has a distributive manufacturing platform for the production of meat from cells.

Founded: 2017 Disclosed Funding: \$42.95M Investment Stage: Series B (02/01/21) Select Investors: Tyson Ventures, Rich Products, Muller Gruppe

## <sup>15</sup> Alternative egg technologies

The production of eggs, like other livestock intensive products, generates negative effects on the environment, including the emission of greenhouse gases and the contamination of soil and water. Companies are using microorganisms to produce chicken-free egg ingredients, as well as whole eggs and egg-based products.

#### Select technologies to watch



## Ready to explore next-generation protein technologies?

Book a consultation with a SOSA innovation expert here.

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