

Foods of the future

People in Singapore will be the first in the world to taste lab-grown meat, as cell-cultured chicken nuggets will soon be on menus here. **Shabana Begum** highlights the companies and research involved in foods of the future, from insects to algae.

Shiok Meats

(From left) Shrimp spheres, lobster gazpacho and lobster terrine

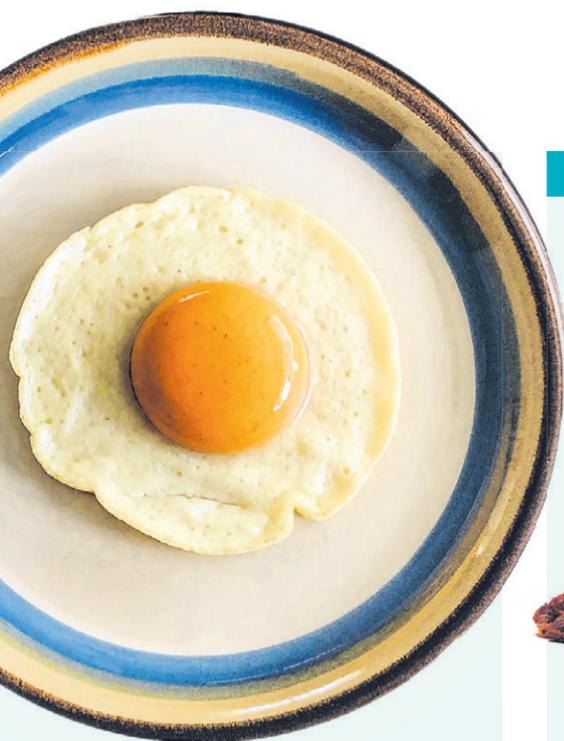


Lab-grown seafood

- The first cell-based meat company in South-east Asia, formed in 2018
- Creates crustacean meats such as shrimp, lobster and crab from the animals' cells, and multiplies the cells in a "culture media" solution filled with nutrients
- Shrimp meat takes between four and six weeks before it can be harvested, and lobster meat takes longer

Progress

- It debuted its lab-grown shrimp dumplings in March last year
- Last month, it showcased its cell-based lobster meat in two dishes - a terrine and its lobster flavouring in a gazpacho
- It hopes to launch a crab prototype in a few months
- Its prawn meat now costs US\$3,500 per kg, and the start-up is hoping to reduce the cost to US\$50 per kg in 2022, when the novel seafood will be sold to businesses like restaurants
- It is looking to build a manufacturing plant in Senoko by 2022



Egg made from legumes

Float Foods

- The liquid egg white and spherical yolk made from legumes come as separate components

Progress

- Float Foods will launch the whole egg, called OnlyEg, in the first quarter of 2022
- The company will roll out its plant-based egg patty and shredded egg next year
- It is working with the Agency for Science, Technology and Research (A*Star) to increase the protein level of OnlyEg to ensure a higher nutritional value. The egg will have no cholesterol and be hormone and antibiotic-free

Ants Innovate



Cell-cultured meat snack

Cell-cultured pork cuts

- Spun off from A*Star in May this year, Ants Innovate is South-east Asia's first cultivated whole meat cut company, compared with most other companies, which are producing mince
- Pig cells are multiplied in a nutrient media, and are put onto cellular "scaffolding". The firm's proprietary technology layers and stacks the cells, arranging them into whole cuts of meat, such as pork chops and shoulders
- The technology recreates the structure and mouthfeel of meat

Progress

- The company created its first meat snack prototype in June
- It is aiming to launch its cultivated meat snack and cutlet late next year. The company is also looking to produce meat cuts like steak and pork belly by 2022 or 2023

Eat Just's chicken bites and plant-based liquid egg



- Last Wednesday, the Californian start-up announced that it received regulatory approval from the Singapore authorities to sell the chicken here
- The cell-cultured nuggets would cost as much as premium chicken in restaurants
- In October, Eat Just announced a \$160 million facility in Singapore to produce its plant-based eggs made from mung beans. The egg products are available as a liquid scramble and folded egg patties
- Both egg products cost about US\$5 (S\$7)
- The production facility will meet the demand for the company's artificial eggs across Asia
- The chicken bites will also be manufactured in Singapore



TurtleTree Labs

- Founded last year, it is believed to be the first company in the world to create raw milk from cells
- Mammary stem cells are extracted from the milk of mammals, such as cows
- The cells are grown and exposed to a special formula that causes them to lactate
- The cells will adhere to the outside of long tubes that have lactation media flowing through them.
- Milk then flows out of the other end of the tube, and is obtained through filtration

Progress

- The company will be setting up its pilot facility in Singapore next year



Cells from cow's milk will adhere to the outside of the tubes in the petri dish

Nature's Fynd (United States)

- Fungi protein found in volcanic hot springs
- A microbe fungi, *Fusarium strain flavolapis*, was extracted from the hot springs of Yellowstone National Park
- Fermentation is used to convert it into a protein, called Fy, which is harvested into a solid, liquid or powder that can be used in food and drinks
- The Fy protein contains all 20 amino acids

Progress

- The company began production early this year at its factory in Chicago
- It is planning to produce "a hamburger equivalent" next year

Sophie's Bionutrients



Plant-based patties made with microalgae protein

- The firm has produced two types of protein flours made from the fermentation of microalgae
- The protein flour can be used in any food types, from burger patties to crab cakes
- The fermentation process can bring out certain flavours like the signature taste of seafood
- Microalgae is grown and fermented in a bioreactor, and once harvested after three days, the protein is extracted
- Microalgae is a nutrient-rich green filled with minerals, vitamin B and even Omega-3

Progress

- The company completed 10,000 litres of fermentation in February, and will be running its first facility at Science Park 2 in the second quarter of next year
- It is in talks with a client that could potentially use the flour to produce chicken essence

Asia Insect Farm Solutions

Cricket flour



- Insects are considered a superfood
- The local agri-tech company sells ground up crickets made into a flour that can give cookies, bread and cakes a protein boost. The flour starts at \$7 per 100g
- The company infuses cricket powder in spices such as curry powder
- Insect-based food for humans is more common abroad: A Cambodia-based insect snack company recently launched roasted black soldier fly larvae, called Bug Bacon
- The roasted grub, packaged like chips, comes with various seasonings such as sweet maple and BBQ
- Crickster - a company in Denmark - sells items such as freeze-dried buffalo worms and crunchy mealworm snacks
- Such edible insects are packed with high-quality proteins and vitamins, and use less space when farmed

Nature's Fynd's CEO Thomas Jonas folding the Fy protein



• Clean, sustainable and cruelty-free, alternative proteins - from lab-grown meat to microbes found in extreme volcanic environments - are set to be part of the future human diet.

• With the world's population projected to reach 10 billion by 2050, innovation and creativity are needed to invent more sustainable ways to remain nourished.

• Companies that produce proteins through fermentation of algae and fungi, for one, believe their technologies will be used in space someday.

• But more research must be done to be certain that food churned out of labs will stick to their promise of low carbon.

• Singapore is making good progress in the use of alternative proteins, but what also matters is the buy-in of the public.