

Scientists are making seafood in the laboratory



The shrimp-meat siew mai on the right may look like what you order from a dim sum restaurant, but they cost a whopping \$150 per piece. The shrimp-meat was grown in a laboratory. [Photo: Shiok Meats]

Local company Shiok Meats successfully grew shrimp meat in a laboratory. SHEERE NG explains why this could be good news for Singapore.

The shrimp filling wrapped in yellow dumpling skin looks and tastes like any siew mai from a dim sum restaurant, but it costs a whopping \$150 per piece — more expensive than a whole lobster.

The shrimp did not come from the sea but was grown from the animal's **stem cells** in a laboratory. Its creators are stem cell biologists Sandhya Sriram and Ling Ka Yi, whose company Shiok Meats is the first cell-based meat company in Southeast Asia. Most other such companies are based in the United States.

Unlike other companies producing beef or chicken, Shiok Meats focuses on creating seafood. “[In Asia], we eat a lot of seafood, and not many companies were doing seafood,” said Dr Sriram in an interview with Channel News Asia.

So, a few years ago, the scientists took the cells of real shrimps, fed them with a liquid full of nutrients, and then waited for them to multiply. The cells became shrimp meat in two to four weeks.

Such cell-based meat could reduce our dependency on wild-caught or farmed shrimps, which have caused problems for the environment and our well-being.



Dr Ling Ka Yi (left) and Dr Sandhya Sriram. [Photo: ShioK Meats]

Sources of shrimps

Shrimps typically live at the bottom of the ocean, where the majority of marine life lives. Fishing for shrimps involves scraping the ocean's floor, which harms other marine life such as sea turtles and starfish too. This damages the ecosystem, sometimes permanently. We are also fishing more shrimp than the animal can reproduce itself. Over time, overfishing could cause its extinction.

While shrimp farming is common today, it has its problems too. It requires a lot of space. The farmers don't always have that, so they overcrowd the shrimps. This quickly pollutes the water and makes the animals sick. Some farmers feed their shrimps antibiotics to prevent this. However, eating too much of such shrimps can be bad for our health.

Singapore has more than 100 fish farms along its coast, supplying only nine per cent of what we eat. The government has a goal to grow at least one-third of our food by 2030. This is to ensure that we will have enough to eat even as global warming decreases the availability of food across the world. However, our country has limited sea space to support more coastal farms to feed Singaporeans.

Coastal farms are also vulnerable to environmental threats, such as plankton blooms, oil spills, and warmer waters from climate change. These threaten to kill the fish and shrimps before they even make it to our dinner plates.

Cell-based shrimp offers an alternative. Not only is ShioK Meats' production in the laboratory immune to the effects of climate changes, it does not damage the environment either. The cells are also taken from carefully chosen shrimps, so that the meat produced is free from antibiotics.

“Currently, the way shrimps are being grown in farms, they are being grown in dirty water and being injected with antibiotics and

hormones to keep them clean and make them bigger. We had to find very specific shrimp farms for clean shrimp to source our stem cells,” said Dr Sriram.

Why so expensive?

Shiok Meats’ shrimp comes with a **hefty** price tag because the liquid nutrient used to feed the cells is only made in small quantities by pharmaceutical companies. Consisting of protein, carbohydrates, and fats, the liquid helps shrimp cells to grow into meat, without the need for a digestive system to absorb nutrients like in a normal shrimp.

Ninety percent of the cost of cell-based shrimp lies in the liquid nutrient. The company is working to produce its own liquid nutrient to bring down the cost. If it is successful, it could bring down the current price of \$5,000 per kilogramme to just hundreds of dollars or even lower by early next year.

In the near future

When the time comes, Shiok Meats will start selling its shrimp meat to restaurants, where consumers will get the first taste of it. The company also plans to develop whole shrimp for sale. Right now, it is only able to **mimic** the texture of minced shrimp. Cell-based crabs and lobsters are in the pipeline too.

Dr Sriram even predicts a future when people can “grow” their own meat at home. All that we will need is a pressure cooker-like machine to control the right temperature for the cells to grow. “It’s much like making beer or wine at home, or even baking a piece of bread,” she said. This future, she added, could be as soon as within the next 10 years.

..... **VOCAB BUILDER**

stem cells (say “**stem** sells”; noun) = unspecialised cells that can multiply and give rise to many different types of cells.

hefty (say “**hef**-tee”; adjective) = large.

mimic (say “**mi**-mik”; verb) = imitate.