

# The GM salmon inventor

NUS professor Hew Choy Leong's research was born out of a joke with a colleague during a coffee break in the 1980s

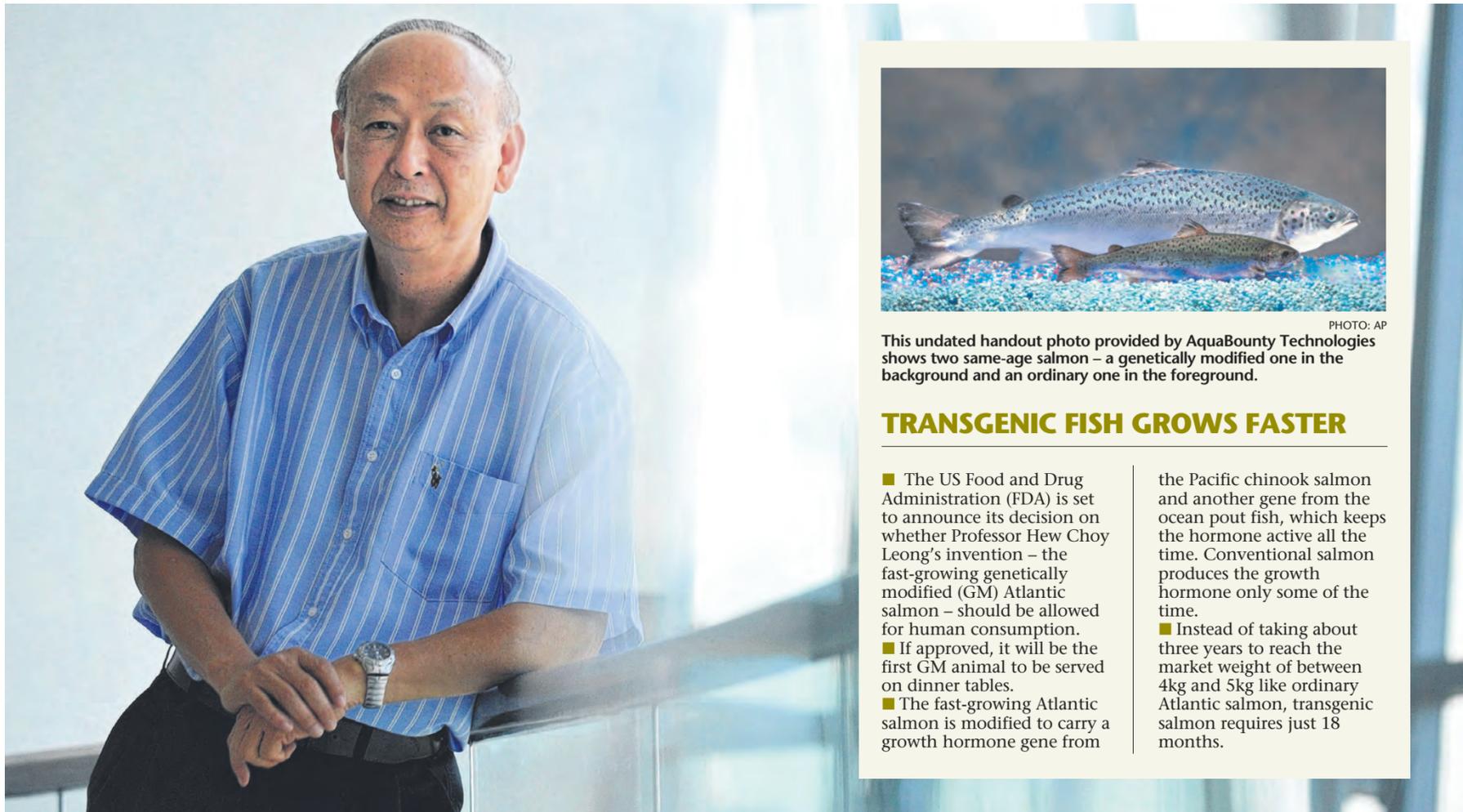


PHOTO: AP  
This undated handout photo provided by AquaBounty Technologies shows two same-age salmon – a genetically modified one in the background and an ordinary one in the foreground.

## TRANSGENIC FISH GROWS FASTER

- The US Food and Drug Administration (FDA) is set to announce its decision on whether Professor Hew Choy Leong's invention – the fast-growing genetically modified (GM) Atlantic salmon – should be allowed for human consumption.
- If approved, it will be the first GM animal to be served on dinner tables.
- The fast-growing Atlantic salmon is modified to carry a growth hormone gene from

the Pacific chinook salmon and another gene from the ocean pout fish, which keeps the hormone active all the time. Conventional salmon produces the growth hormone only some of the time.

- Instead of taking about three years to reach the market weight of between 4kg and 5kg like ordinary Atlantic salmon, transgenic salmon requires just 18 months.

Prof Hew, 68, is unfazed by the angry reaction from consumer groups who argue that the fish could threaten the environment and human health, saying he developed it to improve food production.

ST PHOTO: DESMOND FOOTE



Huang Lijie

Professor Hew Choy Leong dedicated almost 20 years to researching a fast-growing Atlantic salmon but little in his office at the National University of Singapore (NUS) betrays his devotion.

That is except for an abstract sculpture of a salmon in mid-leap displayed on his table. It is a gift from the institution, when he stepped down as head of the biological sciences department in 2008.

The engraving on the sculpture reads, "You exemplify the sterling qualities of the Atlantic salmon."

The fish is a popular symbol for resilience and returning talent because it swims against the tide to return to its birthplace to spawn.

Indeed, the Nanyang University alumnus is making waves in the world of science.

His invention – fast-growing genetically modified (GM) Atlantic salmon – is the subject of a furious battle raging in the West over whether it should be allowed for human consumption.

The United States Food and Drug Administration (FDA) is poised to announce its decision soon and the chances of approval are high since its advisory panels have not sounded an alarm.

One panel said GM salmon contains the same amount of nutrients and has "no biologically relevant differences" from ordinary farmed Atlantic salmon. Another called it "as safe as food from conventional salmon".

If the FDA gives the nod, the fast-growing salmon will be the

first GM animal to be served on dinner tables.

Its proponents cheer the decision, citing benefits from increased production such as lower prices for the in-demand seafood and reduction in overfishing of wild stock.

However, the proposal has drawn a backlash from consumer groups which

argue that the fish could threaten the environment and human health. Protesters even rallied in front of the White House last month demanding that approval be withdrawn.

The 68-year-old, who is now an emeritus professor at NUS, is unfazed by the angry reaction.

He says: "I used to make a lot of presentations at seminars and conferences on my work and there would always be someone who would yell at me and say he or she would not want to eat anything

**Nothing fishy**  
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PROF HEW, on detractors referring to his invention as "frankenfish"

that contains genetically modified DNA."

He says such emotional outbursts usually stem from objection to scientists tinkering with genetic material and "playing God".

"But as a scientist, I develop this technology with the aim of improving food production, not for fun," he says.

His research in GM salmon, though, was born as a joke over a coffee break.

It happened one day in the 1980s while he was chatting with a fellow scientist at the Memorial University of Newfoundland in Canada.

He was then an assistant professor conducting research on anti-freeze protein in fish that allows them to survive sub-zero temperatures, and his colleague, a well-known salmon aquaculturist, had just returned from a fish farm where all the salmon had frozen to

requires just 18 months.

It took Prof Hew about five years to come up with fast-growing GM salmon and he continued to develop the stock for commercialisation over the next decade.

But what about detracting claims that the splicing and dicing of fish genes may cause GM salmon to trigger an allergic reaction in consumers?

He says: "The only genes we produce are the same salmon genes and the amount is minimal. Unless you are allergic to salmon, you will not be allergic to transgenic salmon."

He adds that because it is nutritionally and biologically similar to ordinary salmon, it is safe for consumption. "I have tasted it and it tastes just like farmed Atlantic salmon. I like it best broiled with some lemon."

As for accusations that GM salmon might dominate and decimate wild stock, he says the fish will be reared in land-based tanks, which minimises ecological disruption of the ocean. Also, they are born as sterile females so even if they escape, they are unable to reproduce.

Still, unkind detractors refer to his invention as "frankenfish".

He says: "As a scientist, I look at it with a sense of humour even though it is not true. But it is an unfair scaring tactic."

In 1991, Prof Hew partnered scientists Garth Fletcher and Boris Rubinsky and businessman Elliot Entis to co-found A/F Protein with the intention of developing GM salmon for the consumer market.

The company was later renamed AquaBounty Technologies and it submitted its first application for FDA approval in 1995. Yet it was not until two years ago that the agency began to consider applications for GM animals.

When he joined NUS in 1999, he chose to leave the company to concentrate on his responsibilities at the university although he still holds shares in the company, which is listed on the London Stock Exchange.

Is he tired of the protracted upstream struggle for approval? Yes and no.

He says: "No, because it means the FDA takes a very serious and careful approach towards reviewing and assessing the first new GM animal product for food."

"And intellectually, I have already completed the exercise as a scientist with a mind to address a major industry problem."

"But I am entitled to royalties from the patent and the patent is running out soon, possibly in the next few years. Had GM salmon been approved 10 years ago and it became a successful business, the money from the royalties would have been a significant sum," he adds, laughing.

But the Ipoh-born son of a tin-mining merchant counts it his good fortune to have had the opportunity to contribute to the education, administration and research quality at NUS.

Some of the initiatives he introduced include a revamped curriculum, better research facilities and more intensive research being done.

The grandfather of two says: "I feel like I have come back home."

lijie@sph.com.sg